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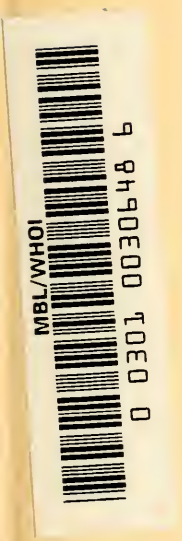

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MANUAL OF THE GRASSES OF THE UNITED STATES

By

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Bureau of Plant Industry

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By A. S. Hitchcock, *principal botanist, Division of Plant Exploration and Introduction, Bureau of Plant Industry*

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INTRODUCTION

Of all the plants of the earth the grasses are of the greatest use to the human race. To the grasses belong the cereals, sugarcane, sorghum, and the bamboos; and, since they furnish the bulk of the forage for domestic animals, the grasses are also the basis of animal industry.

USES OF GRASSES

The grasses furnish the principal breadstuffs of the world and a large part of the food of domestic animals; they are also used in the industrial arts and extensively as greensward and ornamentals in parks and gardens.

FOOD GRASSES

The most important food plants for the human race are the cereals, including wheat, corn (maize), rice, barley, rye, oats, and many kinds of grain sorghums. For primitive peoples the seed of certain other grasses, such as pearl millet, common millet, broomcorn millet, Japanese millet, and African millet (ragi), have played an important role. The seeds of the cereals are also extensively used as feed for domestic animals.

FORAGE GRASSES

Forage grasses are used for hay, for pasturage, for soiling, and for silage.

HAY GRASSES

The grasses together with the clovers and alfalfa are the basis of permanent meadows. The most important perennial grasses used for tame hay are: Timothy (*Phleum pratense*), redtop (*Agrostis alba*), orchard grass (*Dactylis glomerata*), meadow fescue (*Festuca elatior*), smooth brome (*Bromus inermis*), and Johnson grass (*Sorghum halepense*). A few other species are used occasionally or rarely: Rhodes grass (*Chloris gayana*), Dallis grass (*Paspalum dilatatum*), crested wheatgrass (*Agropyron cristatum*), velvet grass (*Holcus lanatus*), Natal grass (*Tricholaena rosea*), tall oatgrass (*Arrhenatherum elatius*), and slender wheatgrass (*Agropyron pauciflorum*). Some of the grasses used primarily for pasture are also occasionally used for hay.

Market hays from grasses usually consist of timothy, prairie grasses, Johnson grass, or grain (wheat, oats, and wild oats). The prairie hays are divided into upland prairie and midland prairie. The species of most importance in the upland prairie are *Agropyron smithii* and *Stipa comata* (northern Great Plains), *Andropogon furcatus* and *A. scoparius* (eastern Great Plains), *A. saccharoides* (Texas), and *Panicum virgatum* (Kansas to Texas). Midland prairie is invariably composed of *Spartina pectinata*. Tussock sedge (*Carex stricta*) is harvested in large quantities on the marshes of Wisconsin for use as packing hay.

For temporary meadows the grasses most used are the cereals, which, with wild oats, furnish the grain hay of the Pacific coast, the sorghums, including Sudan grass, and millet (*Setaria italica*).

PASTURE GRASSES

The more common grasses used for permanent pasture are: Kentucky bluegrass (*Poa pratensis*), Bermuda grass (*Cynodon dactylon*), redtop (*Agrostis alba*), colonial bent (*A. tenuis*), orchard grass (*Dactylis glomerata*), smooth brome (*Bromus inermis*), Italian ryegrass (*Lolium multiflorum*), perennial ryegrass (*L. perenne*), meadow fescue (*Festuca elatior*), Dallis grass (*Paspalum dilatatum*), carpet grass (*Axonopus compressus*), Canada bluegrass (*Poa compressa*), and sheep fescue (*Festuca ovina*). Many of the meadow grasses mentioned above are also used for pasture.

Temporary pasture is furnished by the cereals and by rescue grass (*Bromus catharticus*), Italian ryegrass, and Sudan grass.

Two grasses, important in the Tropics but in the United States grown only in southern Florida and southern Texas, are Guinea grass (*Panicum maximum*) and Para grass (*P. purpurascens*).

SOILING GRASSES

Grasses used for soiling are for the most part the cereals, millet, and other annual grasses used for temporary meadows, and in addition but only locally, pearl millet (*Pennisetum glaucum*), teosinte (*Euchlaena mexicana*), and Napier grass (*P. purpureum*).

SILAGE GRASSES

Any grass may be cut and stored in silos, but corn (maize) and sorghum are the ones most used.

RANGE GRASSES

A large number of grasses make up much of the wild pasture, known in the West as the range, only the more abundant and valuable of which are recognized by stockmen as important. Probably the best known range grass is buffalo grass (*Buchloë dactyloides*), a sod-forming "short grass" dominant over much of the Great Plains. Throughout the same region two tufted short grasses, blue grama (*Bouteloua gracilis*) and hairy grama (*B. hirsuta*), are abundant. In Texas the dominant grass over much of the range is curly mesquite (*Hilaria belangeri*) a sod-former similar to buffalo grass.

In the prairie region of the Mississippi Valley and in the eastern part of the Great Plains certain "tall grasses" in earlier days furnished excellent hay and pasture, but in recent times these fertile grasslands have been broken up for cultivated fields. The more important tall grasses are bluejoint turkeyfoot (*Andropogon furcatus*), prairie beardgrass (*A. scoparius*), switch grass (*Panicum virgatum*), side-oats grama (*Bouteloua curtipendula*), and Indian grass (*Sorghastrum nutans*).

The marsh hay of the northern Mississippi Valley consists of bluejoint (*Calamagrostis canadensis*), reed canary grass (*Phalaris arundinacea*), and a few other wet-land species.

The forage grasses of the Great Basin include species of *Poa*, *Festuca*, *Bromus*, *Aristida*, and *Stipa*. In the Southwest, the gramas, species of *Bouteloua*, dominate the range. A large bunchgrass, sacaton (*Sporobolus wrightii*), and alkali sacaton (*S. airoides*) furnish much forage.

A few of the many nutritious species found in the Northwestern States are greenleaf fescue (*Festuca viridula*), bluebunch fescue (*F. idahoensis*), pinegrass (*Calamagrostis rubescens*), slender wheatgrass (*Agropyron pauciflorum*), California bromegrass (*Bromus carinatus*), and in the semiarid regions bluebunch wheatgrass (*Agropyron spicatum*).

GRASSES IN THE INDUSTRIAL ARTS

The most important species of the industrial arts group is the sugarcane (p. 718). This might be included among grasses that furnish food, but sugar is a manufactured product.

The chief fiber-producing grasses are esparto (*Lygeum spartum* and *Stipa tenacissima*) also known as alfa, natives of Spain and north Africa. The leaves and stems are utilized in paper making. The pith of the cornstalk and the oil of the corn grain find many uses in the arts.

Certain aromatic grasses furnish essential oils used in perfumery. The best known are the lemon grass (*Cymbopogon citratus*), citronella grass (*C. nardus*), and vetiver (*Vetiveria zizanioides*).

The bamboos, the largest of the grasses, are of vast importance in the Indo-Malay region and are receiving increasing attention in the United States. The larger kinds reach a height of 30 meters and are 15 to 25 or 30 centimeters thick below, tapering to the summit. The culms or stems are very strong and are used in building houses and bridges. When the stems are split, flattened out, and the partitions at the joints removed they make very durable boards, a foot or more wide, for floors and walls. Rafts and floats are made of the hollow stems closed at the joints by natural airtight partitions. With the partitions removed bamboo stems furnish water pipes or

conduits. Sections of the stem closed at one end by the partition form convenient vessels for holding water. Much of the furniture and many of the utensils and implements used by the Malays are made wholly or in part of bamboo. Slender bamboo stems are familiar to us in the form of fishing rods and walking canes. Shoots of *Phyllostachys edulis*, *Bambusa beecheyana*, and other species of bamboo are a choice vegetable in the Orient and an expensive dainty in the United States.

Brooms are made from the seed heads of broomcorn, a variety of sorghum. Leghorn hats are made of a kind of wheat straw cut young and bleached. Straw of rice and oats is used for matting and for hats.

Starch and alcohol are made from the grain of maize, wheat, and other cereals. The stalks, grain, and cobs of maize furnish a great variety of products, such as wallboard, glucose, oil, red rubber, and corncob pipes.

SOIL-HOLDING GRASSES

Grasses used to hold soil in place and prevent erosion by wind or water possess strong creeping rhizomes.

Sand-binding grasses in addition are able to grow up through the deepening sand. The most effective sand binders for seacoast drifting sand are the European beachgrass (*Ammophila arenaria*) and its American relative (*A. breviligulata*). The dunes of the Netherlands, southwestern France, northern and western Denmark, and other parts of Europe and areas on Cape Cod are planted with beachgrass. These fixed dunes act as barriers, protecting the land behind them. The land now occupied by Golden Gate Park, once an area of drifting sand, was first held in place with beachgrass and later planted to shrubs and trees. *Calamovilfa longifolia* and *Redfieldia flexuosa* are effective native sand binders on sand dunes of the interior.

Grasses with strong rhizomes are used to hold the sides of cuts and banks and to protect them against erosion. Bermuda grass in the South and quackgrass (*Agropyron repens*) in the North have been used successfully for this purpose. Rhizome-bearing species of *Elymus* and *Agropyron* have been used in the Northwest to hold railway embankments along the Columbia River.

Shallow-water marshes and lagoons are in many places being converted into dry land by native plants growing therein that accumulate soil and gradually raise the level of the bottom. Grasses, especially species of *Spartina*, play an important part in the process. Recently artificial plantings of *S. townsendii* have been used with great success in the south of England, northern France, and in parts of the Netherlands to convert marshes and mud flats along the coast into dry land.

GRASSES FOR LAWNS AND GOLF COURSES

The lawn is a most important part of a well-planned landscape, park, or garden. For the humid regions of the Northern States, Kentucky bluegrass, also used for pasture, is the best-known lawn grass. Rough bluegrass (*Poa trivialis*) is often used as a lawn grass in shady places. In the Southern States Bermuda grass takes the place of bluegrass. Two other species are becoming prominent as grasses for lawns and putting greens, creeping bent (*Agrostis palustris*), and colonial bent (*A. tenuis*). Along southern coasts St.

Augustine grass (*Stenotaphrum secundatum*) and centipede grass (*Eremochloa ophiuroides*) are planted, being propagated by cuttings. Some of the fescue grasses are used in mixtures for lawns. These are red fescue (*Festuca rubra*), sheep fescue (*F. ovina*), hard fescue (*F. ovina* var. *duriuscula*), and shade fescue (*F. rubra* var. *heterophylla*).

ORNAMENTAL GRASSES

Among typical ornamentals the plumegrasses, giant reed (*Arundo donax*), Ravenna grass (*Erianthus ravennae*), eulalia (*Miscanthus sinensis*), and pampasgrass (*Cortaderia selloana*) are the most popular for parks and large areas. Dwarf bamboo (*Bambusa nana*) is used for hedges in the South, and the smaller species of *Phyllostachys* for masses of evergreen foliage. *Sasa japonica*, an aggressively spreading hardy bamboo, is rather common in parks. Fountain grass (*Pennisetum ruppelii*) and blue fescue (*Festuca ovina* var. *glauca*) are used for borders. Ribbon grass (*Phalaris arundinacea* var. *picta*) is a familiar grass in old gardens. Basket grass (a variegated form of *Oplismenus hirtellus*) will fall in long festoons from hanging baskets.

DISTRIBUTION OF GRASSES

One of the most widely distributed of the families of flowering plants, the grasses are found over the land surface of the globe, in marshes and in deserts, on prairies and in woodland, on sand, rocks, and fertile soil, from the Tropics to the polar region and from sea level to perpetual snow on the mountains.

The different grasses, like other kinds of plants, thrive best under certain conditions of soil, moisture, temperature, exposure, and altitude. The conditions under which a plant normally grows is its habitat. Some species are narrowly restricted in their habitat—being found only in sand or on rocks, in salt marshes or on alpine summits, for example, whereas others are tolerant of wide variations of habitat. Red fescue (*Festuca rubra*) is an example of wide distribution of a species tolerant of a variety of habitats. It is found from the arctic regions south at low altitudes to Georgia and central California and in the mountains farther south, and from the seacoast marshes to mountain tops.

Each species is found growing over a rather definite geographic area but within this area it is confined to its particular habitat.

In mountain regions altitude is an important factor in modifying range, each species thriving within certain limits of altitude. Species found at high altitudes in one range of mountains may reappear at about the same altitude on other ranges. Certain grasses growing at low levels in the north are found in the mountains and at increasingly higher elevations southward.

The geographic range is of importance and is given in some detail for each species in the manual. The range as given is based upon the study of a vast amount of material, both in the herbarium and in the field. For convenience in keeping the records of distribution a series of outline maps, one for each species or variety, has been prepared in the grass herbarium of the United States National Herbarium. The known range of each species is indicated upon these maps by a dot on each State from which specimens are in the herbarium or have been examined by the author. (A few extensions

of range have been found since the maps were engraved. These are included in the text.) Local floras, lists, and records of distribution have been checked and efforts have been made to verify the records that seemed to indicate an extension of range. Other herbaria have been visited or have lent specimens, and many correspondents have submitted specimens for verification. No additions have been made without a study of the specimens.

The ranges of native species are usually fairly well defined and continuous. A species of the Coastal Plain extends, for example, from New Jersey to North Carolina or from Virginia to Florida and Texas, without a conspicuous break. Mountain plants extend along mountain ranges where similar conditions prevail. Some species have in the main a continuous range but are found also in isolated and distant localities. *Bouteloua hirsuta* extends over the Great Plains east to Wisconsin and Louisiana, and again occurs abundantly and apparently native on Sanibel Island, Fla. Some Coastal Plain species appear again around the head of Lake Michigan. In these cases it is probable that the species do not occur in the intermediate areas.

Certain arctic or northern species also show interrupted range, being found within the limits of the United States only on isolated mountain tops. The arctic grass, *Phippsia algida*, for example, is known within the United States only from alpine summits in Colorado. What appear to be interrupted ranges along the northern or southern borders are mostly due to extensions into this country from the main ranges in Canada or Mexico.

The distribution of recently introduced species is often very erratic. A single introduction may maintain itself or even spread considerably for several years before coming to the notice of botanists. Introduced species often travel rapidly along railroads by means of cattle cars, or they spread as impurities in the seed of crop plants. That seeds may travel great distances through the air has been shown by experiments in which airplanes have collected seeds, insects, and other objects at varying heights in the atmosphere. For example, spikelets of *Paspalum dilatatum* and *P. urvillei* were taken at altitudes up to 5,000 feet in Louisiana.

Grasses introduced into cultivation may spread or "escape" from cultivation and become established over wide areas. Kentucky bluegrass (*Poa pratensis*) and the ryegrasses (*Lolium perenne* and *L. multiflorum*) are familiar examples. Johnson grass is an excellent forage grass, but if it escapes into cultivated fields may become a troublesome weed

Other cultivated grasses, such as the grains, frequently spread from fields but are unable to maintain themselves for long. Eulalia (*Miscanthus sinensis*) has been cultivated for ornament in the eastern part of the United States for many years. Only recently has it shown a tendency to spread by seed. It is now becoming a nuisance in some localities because of its aggressiveness in old fields.

MORPHOLOGY OF GRASSES

The organs of grasses undergo many modifications or departures from the usual or typical structure. A knowledge of the structure and modifications of the organs, especially of the parts of the spikelet, is essential for the interpretation of relationships.

VEGETATIVE ORGANS

In size grasses vary from minute species only 2 or 3 cm high to the giant bamboos 30 m tall. The vegetative organs, however, consist, in all cases, of root, stem, and leaves. A single unbranched stem with the attached leaves, is a shoot.

ROOT

The roots of grasses are fibrous with little modification. The primary root persists only a short time after germination, its place being taken by secondary roots produced from the nodes of the young culm. Besides the original root system at the base of the plant, secondary roots are often formed from nodes above the ground as in maize (prop roots), or from the nodes of creeping culms (rhizomes or stolons). Roots are never produced from the internodes of the culms.

STEM

The jointed stem of a grass, called a culm, is made up of a series of nodes and internodes. The internode is hollow (wheat), or solid (maize); the node or joint is always solid. The culm may branch at the base as in wheat (stools) or above the base as in *Muhlenbergia.* Creeping culms, modified for propagation, may be below ground (rhizomes) or above ground (stolons). The lower internodes may thicken into corms (timothy, species of *Melica, Arrhenatherum elatius* var. *bulbosum*), sometimes referred to as bulbs. Perennial grasses may form a sod or mass of individuals by means of rhizomes or stolons, or they may form a crown or tuft by the continual formation of upright branches within the lower sheaths.

LEAF

The leaves are borne on the culm in two ranks, one at each node The leaf consists of sheath and blade. The sheath envelops the culm above the node, the margins overlapping (open) or infrequently united into a cylinder for a part or a whole of the distance to the summit (closed).

The blades are typically flat, narrow, and sessile. In dry regions they are usually involute or convolute; in tropical shade they are often comparatively short and wide (lanceolate, ovate, or elliptic); in most of the bamboos they are narrowed into a short petiole articulate with the sheath.

Some grasses (especially the Hordeae) bear, one on either side at the base of the blade, appendages known as auricles. At the junction of the blade and sheath on the inside is a membranaceous or ciliate appendage called the ligule. The region on the back of the leaf at the junction of the sheath and blade is called the collar.

PROPHYLLUM

At the point where a branch shoot originates from a main shoot, (in the axil of a sheath) there is produced on the side next to the parent shoot a two-keeled organ (the first leaf of the shoot) called the prophyllum. At first the prophyllum completely covers the bud but later opens as the shoot develops. The organ is usually concave toward the parent shoot but clasps the new shoot by its margins.

FLORAL ORGANS

The floral organs of all flowering plants are modified shoots. The flowers of grasses consist of stamens and pistils with no floral envelops or perianth, except as they are represented by the lodicules.

THE INFLORESCENCE

The unit of the grass inflorescence is the spikelet. The spikelets are nearly always aggregated in groups or clusters which constitute the inflorescence. The tassel of maize, the spike or head of wheat or timothy, and the panicle of the oat or bluegrass are examples of inflorescences.

The simplest inflorescence is the raceme, in which the spikelets are pediceled along an axis. The typical raceme, as in *Pleuropogon*, is rare in grasses. Modified spikelike racemes are characteristic of *Paspalum*, *Digitaria*, and allied genera, in which the spikelets are paired and short-pedicellate, and of most Andropogoneae, in which the spikelets are paired, one sessile the other pedicellate. The inflorescences of the groups mentioned may best be considered as specialized panicles.

The spike differs from the raceme in having sessile spikelets. In the Hordeae the spikes are symmetrical, in the Chlorideae they are one-sided.

The panicle is the commonest kind of grass cluster. In this the spikelets are pediceled in a branched inflorescence. The panicle may be open or diffuse as in *Panicum capillare* or contracted as in millet. Compact panicles, especially if cylindric like timothy, are called spikelike panicles.

Numerous small inflorescences may be aggregated into a large or compound inflorescence. Many Andropogoneae have compound inflorescences, for example, the broomsedge (*Andropogon virginicus*).

Panicles often expand at the time of flowering (anthesis). Such expansion or spreading of the branches and branchlets is brought about by the swelling of motor organs (pulvini) in the axils of the inflorescence.

Sometimes the ultimate branches of an inflorescence are sterile instead of bearing spikelets. The sterile branchlets of *Setaria*, *Pennisetum*, and *Cenchrus* are modified into bristles around the spikelets.

THE SPIKELET

A typical spikelet consists of a short axis (rachilla) on which the flowers are borne in the axils of two-ranked imbricate bracts. The spikelet is, therefore, a reduced modified shoot in which the rachilla is a stem bearing at each node a reduced leaf (bract). The flowers are secondary reduced shoots borne in the axils of the bracts, the first bract (palea) on the secondary shoot being a modified prophyllum and the stamens and pistil being modified leaves or bracts. The bracts of the lowest pair on the rachilla, being always empty, are distinguished as glumes. The succeeding bracts are called lemmas (flowering glumes of some authors). The glumes and lemmas represent the sheath of the leaves, the blades not developing (in proliferous spikelets the parts are partially developed into typical leaves). The lemma, palea, and included flower are called the floret. The branchlet bearing the spikelet is the pedicel.

The spikelet may be reduced to a single floret (Agrostideae), sometimes with a prolongation of the rachilla behind, as in *Calamagrostis*. In *Andropogon* a fertile spikelet is paired with a sterile one in which the pistils or both pistils and stamens are absent. The upper florets of the spikelet are often reduced in Festuceae and the lower lemmas may be empty in some genera (*Uniola*, *Distichlis*). In *Melica* and *Chloris* the upper florets may be reduced and form a club-shaped body. In *Phalaris* there is one fertile floret with a pair of sterile florets below, each reduced to a small appressed scale. In *Lamarckia* and *Cynosurus* there are prominent sterile spikelets mixed with the fertile ones.

In Paniceae the spikelet has a perfect terminal floret and below this a sterile floret, consisting of a sterile lemma similar to the glumes, either empty or with a hyaline palea or sometimes with a staminate flower.

In a few grasses (*Amphicarpum*, *Chloris chloridea*) there are, in addition to the usual inflorescence aboveground, cleistogamous spikelets borne on underground culms.

RACHILLA

The axis bearing the florets, the rachilla, usually disarticulates between the florets when the spikelet is more than one-flowered. In many species of *Eragrostis* it is continuous, usually bearing the persistent paleas, after the remainder of the florets have fallen. When the rachilla disarticulates the break is usually just below the florets so that the rachilla joint remains attached as a little stipe back of the palea. The disarticulation is near the middle of the internode in *Trichoneura* and *Festuca subuliflora*. The rachilla disarticulates just above the floret in *Phragmites*, the rachilla remaining as a plumose stipe below it. The rachilla is short-villous or pilose in many genera of Aveneae (the callus of the floret often pilose also).

In some genera with one-flowered spikelets (*Calamagrostis*, *Cinna*, *Cynodon*) the rachilla is prolonged behind the floret as a slender, often villous, joint or bristle, and in several genera with several-flowered spikelets (*Koeleria*, *Poa*) it is prolonged beyond the uppermost floret.

GLUMES

The glumes are usually similar in shape and texture, the first often smaller and with fewer nerves. Rarely the first glume is longer than the second (species of *Aristida*). The first may be much reduced or wanting (*Axonopus*, *Paspalum*, *Digitaria*). Rarely both glumes are wanting (*Leersia*, *Reimarochloa*). In *Eriochloa* the first glume is reduced or wanting, the first rachilla joint being a hard ring below the spikelet. In Andropogoneae the first glume is usually indurate, sometimes strongly so. In some Hordeae the glumes are bristlelike.

LEMMAS

The lemmas in the more primitive grasses are typically similar to the glumes but may be variously modified. In *Panicum* the fertile lemma is much harder than the glumes; in Andropogoneae they are much thinner than the glumes, often hyaline. The indurate cylindric lemma of *Stipa* and *Aristida* bears a sharp callus at base, formed by the oblique articulation with the rachilla.

PALEA

The palea is mostly two-keeled and often concave between the keels. It is homologous with the prophyllum. Sometimes the two nerves of the palea are so close together as to appear like a single nerve (*Cinna*); sometimes the two nerves are marginal and widely separated as in rice. The keels may be ciliate (*Eragrostis*), bearded (*Triplasis*), or winged (*Pleuropogon*). The palea is much reduced or wanting in species of *Agrostis*. Usually the palea falls with its lemma but in many species of *Eragrostis* it persists upon the rachilla after the fall of the lemma.

FLOWER

The flower proper consists of the stamens and pistil. The stamens are usually 3 but may be 1 to 6, rarely more. The slender filaments bear two-celled anthers which are basifixed but so deeply sagittate as to appear versatile. The pistil is one-celled, with one ovule; the styles are usually 2 but may be 1 or 3; the stigmas may arise from a single style or directly from the ovary. The style of *Zea* is greatly elongate and stigmatic over much of the exserted surface.

The lodicules are small organs found at the base of the floret outside the stamens. There are usually two, rarely three, the function of which is to open the floret at anthesis by their turgidity. They probably represent much reduced divisions of a perianth.

Typically the grasses are adapted to cross-pollination, but many species are cleistogamous in part. The axillary inflorescences of some species (*Panicum clandestinum* and allies, *Leersia oryzoides*) are enclosed in the sheaths and are self-pollinated. The florets of wheat expand for only a short time, when cross-pollination may take place, but for the most part are self-pollinated.

The fruit of the grasses is usually a caryopsis, in which the single seed is grown fast to the pericarp, forming a seedlike grain. In a few genera (*Sporobolus*, *Eleusine*), the seed is free from the pericarp. The caryopsis may be free from the lemma and palea, as in wheat, or it may be permanently enclosed, as in the oat and in the Paniceae. The grain (caryopsis) may enlarge during ripening and greatly exceed the glumes, lemma, and palea, as in maize and *Pennisetum glaucum*.

The embryo lies on the side of the caryopsis next to the lemma, and can be easily seen as an oval depression (the "germ" of maize and wheat). The hilum is the dot or line opposite the embryo which marks the point of attachment of the seed to the pericarp. The part of the caryopsis not occupied by the embryo is the endosperm or nourishment for the germinating seed.

CLASSIFICATION OF GRASSES

A natural classification of plants is one in which the different kinds or species are arranged in groups according to their resemblances as shown by their structure, especially (in the grasses and other flowering plants) by the structure of their flowers. The plants of today represent a cross section of the lines of descent from countless generations that have preceded them. It is generally accepted that there has been much variation during the evolutionary process, and that all living plants are genetically connected through their lines of descent. Some of the gaps in present-day knowledge of relationship are filled by fossil remains but relatively few of the ancestors of living plants

are represented by fossils. Knowledge of the ancestry of the kinds of plants now on the globe is necessarily very incomplete. Hence, ideas of the relations of groups to each other are largely inferences based upon morphological resemblances. Those individuals which are so much alike as to appear to be of one kind, with, presumably, a common ancestor in recent geological times, are regarded as belonging to the same species. The species is the unit of classification. For convenience, species are grouped into genera and genera into families. For example, the white oak, red oak, black oak, and other kinds or species of oak belong to the oak genus (*Quercus*), all the species of which have one character in common—the fruit is an acorn. The oak genus, the beech genus, the chestnut genus, and a few allied genera are grouped together as a family.

The grass family (Gramineae or Poaceae) is one of the largest in number of genera and species, and, among flowering plants, is probably the largest in the number of individuals and is one of the most widely distributed. Some genera, such as the bluegrasses (*Poa*), the bromegrasses (*Bromus*), and the immense genus *Panicum*, contain numerous often closely allied species. Some genera contain but a few species or even but one.

When an attempt is made to classify a group of related variable species the question always arises whether there are several closely related but distinct species or a few distinct species, each of which shows great variation. It is but natural that botanists should differ in their conclusions. This explains in part the different classifications of the same group given by botanists of different periods or even of the same period. A satisfactory classification depends upon the study of abundant material both in the field and in the herbarium. By observation in the field one learns the range of variability of a species, while in the herbarium one can compare plants from different localities, interpreting the dried specimens in the light of field experience.

In the classification of variable species it is found convenient sometimes to separate variants as varieties. A variety comprises those individuals of a species that show a definite tendency to vary in a certain direction, but which are connected with the species by rather numerous intergrades. Sometimes a variety is founded on a single variation which is distinct but trivial, for example, pubescent specimens of a glabrous species. A variation supported by a distinct geographical range or even by a distinct habitat is given greater weight than is a variation found in a few individuals growing among plants of the typical form.

The study of a vast amount of material in field and herbarium during some 30 years has resulted in the recognition of relatively few varieties, the intergrades proving to be more numerous than fairly clear-cut variants. Well-marked varieties are given a separate paragraph in the text, but are not usually given in the keys. Less well-marked varieties are given in the paragraph with the species. Many additional forms are indicated in a descriptive statement without being formally recognized as species or varieties. For example, under *Digitaria gracillima* appears, "A tall plant with * * * has been called *D. bakeri* (Nash) Fernald"; and under *Eriochloa michauxii*, "a form with * * * has been described as *E. mollis* var. *longifolia* Vasey."

The arrangement of the genera in this manual is, in general, from the simple to the complex. It is, of course, impossible to arrange all the genera in linear sequence and at the same time represent a gradual increase in complexity because plants have not developed in a single line, but have diverged in all directions, their relationships being a complex network. The highest genus of one tribe may be much more complex than the lowest genus of the next tribe above. On the average the Bambuseae seem to be the most primitive and the Tripsaceae the most complex. A grass with a spikelet consisting of glumes and several florets, the lemmas and glumes being similar and resembling bracts, is a primitive form. Grasses with spikelets in which the parts are reduced, enlarged, or much differentiated, are derived or complex forms. Derived forms may be simple from the reduction of parts and yet not be primitive. In the main the genera of grasses fall readily into a few large groups or tribes, but several genera of uncertain affinities are, for convenience, placed in the recognized tribes on artificial characters, with the hope that further study and exploration will bring to light their true relationships.

The grasses of the world (about 510 genera) have been grouped into 14 tribes, all of which are represented in the United States.

The sequence of tribes and genera in the manual with a few minor changes, is that found in The Genera of Grasses of the United States.

NOMENCLATURE

The cooperative study of botany depends for progress and success on definiteness in the application of the names of plants. Research workers in all branches of botany must use the names of plants in the same sense or serious misunderstandings will result. One of the functions of systematic botany is to determine the correct names of plants. The study of the application of plant names is nomenclature. By common consent of the botanists of the world Latin has been accepted as the language for technical plant names.

Modern nomenclature commences with the publication in 1753 of Linnaeus' Species Plantarum in which the binomial system of naming plants was first proposed. During the nearly 200 years following that date many thousands of plants have been described. During this time there has been a lack of uniformity in the use of names, causing much confusion, and resulting in frequent changes. The same species has been described under different names at different times, and the same name has been given to different plants. This confusion has been especially embarrassing to the agriculturist, ranger, seedsman, pathologist, entomologist, and to all others interested in plants, but not familiar with nomenclature and the history of the names used.

The difference in the Latin names applied in different books to the same kind of grass is due to several causes.

(1) A species is described as new by one author without knowing that the same species had been previously described by another author. The second name is known as a synonym.

(2) An author applies a new name to a variant of a species already described. The author recognizes the variant as a distinct species. Other botanists may consider it to be only a variety of the older species or may consider it as a variant not sufficiently distinct to be worthy of varietal rank.

[1] HITCHCOCK, A. S. THE GENERA OF GRASSES OF THE UNITED STATES, WITH SPECIAL REFERENCE TO THE ECONOMIC SPECIES. U.S. Dept. Agr. Bull. 772, 307 pp., illus. 1920.

(3) Authors have different concepts of the limits of genera. The genus *Triticum* was described by Linnaeus. A later botanist thought that many of the species of this genus were different enough to constitute a distinct genus, *Agropyron*, and transferred quackgrass, first described as *Triticum repens* to *Agropyron*, as *A. repens*.

(4) Authors sometimes misidentify species. Linnaeus described one of the cordgrasses as *Spartina cynosuroides*. Later, Michaux used the specific name for a different species, (*Trachynotia cynosuroides*, based on *S. cynosuroides* L.) This error was corrected and the species described by Michaux was given a new name, *S. michauxiana*. Only recently the loan of the type of *Spartina pectinata* Link, poorly described many years earlier, shows that that name is the valid one for the species.

It will be seen that the differences in names are due in part to differences of opinion as to the generic, specific, or varietal distinctness of forms; in part to lack of knowledge as to what plants have been described previously; and in part to errors of identification.

All the preceding shows the need of rules of nomenclature. To enable users of this manual to coordinate the names published to date a synonymy [2] has been appended in which all the names published for grasses in the United States have been arranged under the names here adopted, that is, under the oldest valid name for each species. In determining the valid names of the species the International Rules of Botanical Nomenclature have been followed. Under these rules certain generic names are conserved though they are not the earliest. The names of genera of grasses on the conserved list are as follows: *Tragus, Zoysia, Leersia, Hierochloë, Crypsis, Coleanthus, Corynephorus, Cynodon, Ctenium, Buchloë, Diarrhena, Lamarckia, Glyceria.*

Certain other names of genera are used for different reasons. *Digitaria* antedates *Syntherisma* with which it is synonymous. *Setaria* was proposed as a conserved name at the Cambridge International Botanical Congress and was referred to a committee along with other names. It was also proposed at the Cambridge Congress (and referred to a committee) that the standard species of *Holcus* be *H. lanatus* and of *Aira* be *A. praecox*, thus validating *Sorghum* and *Deschampsia*.

The synonymy attempts to record all the effectively published names given to species and varieties described from the United States or known to grow in the United States. In addition many names are given which have been published as synonyms or without sufficient description (nomina nuda). Whether such names have been included depends upon whether they have appeared in such works as the Index Kewensis or have some connection with effectively published names. When a species is transferred from one genus to another, a new name results. The basis of the transfer is given in each case. If the name was published as new the original published locality is given. Statements enclosed in brackets following the original locality are based upon unpublished evidence.

Forms (formae) are included in the synonymy so far as they have been indexed in the grass herbarium. The index includes all forms recently published in this country. Misapplied names have not been included among the synonyms but are mentioned in a paragraph at the end of the synonymy of the valid species, and then only names that have appeared in recent manuals are given.

[2] For convenience the names of the genera are arranged alphabetically and under each genus the valid names of the species are given in alphabetic order in boldface type, the synonyms of each species (in italics) being arranged chronologically under the valid name.

So far as possible the names have been confirmed or identified by examination of the types. The type of a species or variety is the specimen which an author had chiefly in mind when he wrote the original description. The type specimen determines the application of the name. The type specimens of the early American botanists are mostly in European herbaria. The types of species described by Vasey and other botanists connected with the Department of Agriculture are mostly in the United States National Herbarium. Types not in Washington have been studied in other herbaria and photographs and drawings made of them by the agrostologists of the Department of Agriculture, or have been lent by the curators of the herbaria in which they are deposited. Through the courtesy of these curators many fragments of types have been deposited in the United States National Herbarium. A few type specimens have not been located, and doubtless in some of these cases there are no types in existence to confirm original descriptions. A relatively small number of published names still remain unidentifiable. These names are listed following the synonymy. Certain exotic species, mentioned by horticultural writers as being occasionally cultivated for ornament, have been included in notes appended to the genera to which they belong. It has not been practicable in all cases to verify the application of the names on a type basis, and the species are admitted under the names they bear in cultivation.

COMMON NAMES

The common or English names of plants are often uncertain in their application, different plants bearing the same name or the same plant bearing different names in different localities. A recent work, Standardized Plant Names,[3] has coordinated and standardized the common names. One of the authors of this work, Frederick V. Coville, has standardized the common names of the grasses for this manual.

SCOPE OF THE MANUAL

The manual includes descriptions of all grasses known to grow in the continental United States, excluding Alaska. There are 159 numbered genera and 1,100 numbered species. Of these, 44 genera and 151 species are introduced, mostly from the Eastern Hemisphere.

In addition to the numbered species, which may be considered permanent constituents of the flora of the United States, there are a number of species which are known only as ballast plants or as waifs in the interior, or are only rarely cultivated. These appear not to be established and are mentioned, without numbers, in paragraphs appended to their nearest allies. They are not included in the keys.

The manual is based mainly on the material in the United States National Herbarium, the grass collection of which is the largest in the world, numbering more than 210,000 sheets. In addition all the larger collections of grasses in the United States have been consulted and the curators have lent specimens for study and have aided in other ways. Many smaller collections have contributed information, especially on the ranges of species. The cooperation of the Forest Service, United States Department of Agriculture, has been invalu-

[3] AMERICAN JOINT COMMITTEE ON HORTICULTURAL NOMENCLATURE. STANDARDIZED PLANT NAMES. Prepared by F. L. Olmsted, F. V. Coville, and H. P. Kelsey. 546 pp. Salem, Mass. 1923.

able. The Forest Service maintains in its Washington office, a range-plant herbarium, consisting of the collections made by forest officers, especially those located in western national forests and forest experiment stations. The grasses of this range-plant herbarium have been placed at the disposal of the writer and have furnished important data on distribution.

Many botanists throughout the country have rendered valuable assistance in recent years by contributing specimens which have added species previously unknown from the United States, have extended ranges, and have helped to solve the position of puzzling species and varieties.[4]

Nearly all the species have been illustrated.[5]

To aid the users of this work in pronouncing the Latin names the accented syllable is indicated. The accent mark is used to show the accented syllable without reference to the length of the vowel.

GRAMINEAE (POACEAE), THE GRASS FAMILY

Flowers perfect (rarely unisexual), small, with no distinct perianth, arranged in spikelets consisting of a shortened axis (rachilla) and 2 to many 2-ranked bracts, the lowest two being empty (the glumes, rarely one or both obsolete), the one or more succeeding ones (lemmas) bearing in their axils a single flower, and, between the flower and the rachilla, a second 2-nerved bract (the palea), the lemma, palea, and flower together constituting the floret; stamens 1 to 6, usually 3, with very delicate filaments and 2-celled anthers; pistil 1, with a 1-celled 1-ovuled ovary, 2 (rarely 1 or 3) styles, and usually plumose stigmas; fruit a caryopsis with starchy endosperm and a small embryo at the base on the side opposite the hilum.

Herbs, or rarely woody plants, with hollow or solid stems (culms) closed at the nodes, and 2-ranked usually parallel-veined leaves, these consisting of two parts, the sheath, enveloping the culm, its margins overlapping or sometimes grown together, and the blade, usually flat; between the two on the inside, a membranaceous hyaline or hairy appendage (the ligule).

The spikelets are almost always aggregated in spikes or panicles at the ends of the main culms or branches. The perianth is usually represented by 2 (rarely 3) small hyaline scales (the lodicules) at the base of the flower inside the lemma and palea. The grain or caryopsis (the single seed and the adherent pericarp) may be free, as in wheat, or permanently enclosed in the lemma and palea, as in the oat. Rarely the seed is free from the pericarp, as in species of *Sporobolus* and *Eleusine*. The culms of bamboos are woody, as are also those of a

[4] The more important are: Brother G. Arsène, Sacred Heart Training College, Las Vegas, N.Mex., collections from Louisiana and New Mexico; H. L. Blomquist, Duke University, Durham, N.C., collections from North Carolina; B. F. Bush, Courtney, Mo., collections from Missouri and Texas; V. H. Chase, Peoria, Ill., collections from Illinois; Charles C. Deam, research forester, Indiana, collections from Indiana; H. I. Featherly, Agricultural and Mechanical College, Stillwater, Okla., collections from Oklahoma; the late William C. Ferguson, Hempstead, N.Y., collections from Long Island; A. O. Garrett, East High School, Salt Lake City, collections from Utah; James E. Nelson, Salem, Oreg., collections from Oregon including ballast plants near Portland; J. B. S. Norton, University of Maryland, collections from Maryland; W. A. Silveus, San Antonio, Tex., collections from Texas, especially in the vicinity of San Antonio, including several novelties; B. C. Tharp, University of Texas, collections from Texas.

[5] The drawings illustrating the genera (previously published in U.S. Department of Agriculture Bulletin 772, The Genera of Grasses of the United States . . .) and nearly half of the others were made by Mary Wright Gill; the remainder were drawn by Edna May Whitehorn; the spikelet drawings are by Agnes Chase. In each case the specimen from which the drawing was made is cited, for example (Nash 2198, Fla.).

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few genera, such as *Olyra* and *Lasiacis*, belonging to other tribes. The culms are solid in our species of the tribes Tripsaceae and Andropogoneae and in several other groups. The margins of the sheaths are grown together in species of *Bromus*, *Danthonia*, *Festuca*, *Melica*, *Glyceria*, and other genera.

The parts of the spikelet may be modified in various ways. The first glume, and more rarely also the second, may be wanting. The lemmas may contain no flower, or even no palea, or may be reduced or rudimentary. Rarely, as in species of *Agrostis* and *Andropogon*, the palea is obsolete.

The division of the family into two subfamilies is somewhat artificial. The tribes Zoysieae, Oryzeae, Zizanieae, and especially Phalarideae, do not fall definitely into either of the recognized subfamilies. They are placed as indicated largely for convenience.

DESCRIPTIONS OF THE SUBFAMILIES AND KEYS TO THE TRIBES

SUBFAMILY 1. FESTUCOIDEAE

Spikelets 1- to many-flowered, the reduced florets, if any, above the perfect florets (except in Phalarideae; sterile lemmas below as well as above in *Ctenium*, *Uniola*, and *Blepharidachne*); articulation usually above the glumes; spikelets usually more or less laterally compressed.

Key to the tribes of Festucoideae

Plants woody, the culms perennial. Spikelets several-flowered.
1. Bambuseae (p. 17)

Plants herbaceous, the culms annual (somewhat woody and persistent in *Arundo*).
Spikelets with 2 (rarely 1) staminate, neuter, or rudimentary lemmas unlike and below the fertile lemma; no sterile or rudimentary floret above.
8. Phalarideae (p. 25)

Spikelets without sterile lemmas below the perfect floret (or these rarely present and like the fertile ones, a dissimilar pair below and a rudimentary floret above in *Blepharidachne*).
Spikelets unisexual, falling entire, 1-flowered, terete or nearly so.
10. Zizanieae (p. 26)

Spikelets perfect (rarely unisexual but then not as above), usually articulate above the glumes.
Spikelets articulate below the glumes, 1-flowered, very flat, the lemma and palea about equal, both keeled. Glumes small or wanting.
9. Oryzeae (p. 25)

Spikelets articulate above the glumes (rarely below, but the glumes, at least one, well developed).
Spikelets 1-flowered (or the staminate 2-flowered) in groups (short spikes) of 2 to 5 (single in *Zoysia*), the groups racemose along a main axis, falling entire; lemma and palea thinner than the glumes.
6. Zoysieae (p. 24)

Spikelets not as above.
Spikelets sessile on a usually continuous rachis (short-pedicellate in *Leptochloa* and *Trichoneura;* the rachis disarticulating in *Lepturus*, *Pholiurus*, *Hordeum*, *Sitanion*, and in a few species of allied genera).
Spikelets on opposite sides of the rachis; spike terminal, solitary.
3. Hordeae (p. 20)

Spikelets on one side of the rachis; spikes usually more than 1, digitate or racemose ---------- 7. Chlorideae (p. 24)

Spikelets pedicellate in open or contracted, sometimes spikelike, panicles, rarely racemes.
Spikelets 1-flowered (occasionally some of the spikelets 2-flowered in *Muhlenbergia asperifolia* and *M. arenacea*).
5. Agrostideae (p. 22)

Spikelets 2- to many-flowered.
Glumes as long as the lowest floret, usually as long as the spikelet (sometimes shorter in *Sphenopholis*); lemmas awned from the back (spikelets awnless in species of *Trisetum*, *Koeleria*, *Sphenopholis;* and *Schismus*)---------- 4. AVENEAE (p. 21)
Glumes shorter than the first floret (except in *Dissanthelium* with long rachilla joints); lemmas awnless or awned from the tip or from a bifid apex---------- 2. FESTUCEAE (p. 17)

SUBFAMILY 2. PANICOIDEAE

Spikelets with one perfect terminal floret (disregarding those of the few monoecious genera and the staminate and neuter spikelets) and a sterile or staminate floret below, usually represented by a sterile lemma only, one glume sometimes (rarely both glumes) wanting; articulation below the spikelets, either in the pedicel, in the rachis, or at the base of a cluster of spikelets, the spikelets falling entire, singly, in groups, or together with joints of the rachis; spikelets, or at least the fruits, more or less dorsally compressed.

Key to the tribes of Panicoideae

Glumes membranaceous, the sterile lemma like the glumes in texture.
Fertile lemma and palea thinner than the glumes. Sterile lemma awned from the notched summit---------- 11. MELINIDEAE (p. 26)
Fertile lemma and palea indurate or at least firmer than the glumes. 12. PANICEAE (p. 26)
Glumes indurate; fertile lemma and palea hyaline or membranaceous, the sterile lemma like the fertile one in texture.
Spikelets unisexual, the pistillate below, the staminate above, in the same inflorescence or in separate inflorescences------ 14. TRIPSACEAE (p. 29)
Spikelets in pairs, one sessile and perfect, the other pedicellate and usually staminate or neuter (the pedicellate one sometimes obsolete, rarely both pedicellate). Lemmas hyaline---------- 13. ANDROPOGONEAE (p. 27)

DESCRIPTIONS OF THE TRIBES AND KEYS TO THE GENERA

TRIBE 1. BAMBUSEAE

Culms woody, perennial, usually hollow; spikelets 2- to several-flowered, in panicles or racemes, or in close heads or fascicles; often 1 or more sterile lemmas at base of spikelet; lemmas usually awnless; blades usually articulated with the sheath, flat, rather broad. Only one genus, *Arundinaria*, is native within our limits. Several species of this and other genera are cultivated in the Southern States.

TRIBE 2. FESTUCEAE

Spikelets more than 1-flowered, usually several-flowered, in open, narrow, or sometimes spikelike panicles (rarely in racemes); lemmas awnless or awned from the tip, rarely from between the teeth of a bifid apex; rachilla usually disarticulating above the glumes and between the florets.

A large and important tribe, mainly inhabitants of the cooler regions. The lemma is divided into several awns in *Pappophorum* and its allies, is deeply 2-lobed in *Triplasis* and in a few species of *Triodia*, 3-lobed in *Blepharidachne*, several-toothed in *Orcuttia*, and slightly 2-toothed in *Bromus* and in a few other genera, the awn, when single, arising from between the teeth. The paleas are persistent upon the continuous rachilla in most species of *Eragrostis*. *Scleropogon*,

Monanthochloë, Distichlis, and a few species of *Poa* and *Eragrostis* are dioecious. *Gynerium, Cortaderia, Arundo,* and *Phragmites* are tall reeds. In *Blepharidachne* there is a pair of sterile florets at the base of the single fertile floret, and a rudiment above. In some species of *Melica* there is, above the fertile florets, a club-shaped rudiment consisting of one or more sterile lemmas. In *Uniola* there are one to four sterile lemmas below the fertile ones. In *Melica imperfecta* and *M. torreyana* there may be only one perfect floret.

Key to the genera of Festuceae

1a. Plants dioecious, (sometimes monoecious), the sexes very dissimilar, the pistillate lemmas with 3 long twisted divergent awns, the staminate lemma awnless or mucronate---------- 38. Scleropogon.
1b. Plants with perfect flowers, or, if dioecious, the sexes not dissimilar in appearance.
2a. Lemmas divided at the summit into 5 to several awns or awnlike lobes. Awnlike lobes 5. Inflorescence an erect raceme or simple panicle. 34. Orcuttia.
Awns 9 or more.
Awns unmixed with awned teeth; all the florets falling attached, their awns forming a pappuslike crown, the lower 1 to 3 fertile; panicles narrow---------- 37. Pappophorum.
Awns mixed with awned teeth; florets not falling attached, the rachilla disarticulating between them; panicles somewhat open- 36. Cottea.
2b. Lemmas awnless, with a single awn, or, if with 3, the lateral awns minute.
3a. Tall stout reeds with large plumelike panicles. Lemmas or rachilla with long silky hairs as long as the lemmas.
Leaves crowded at the base of the culms---------- 25. Cortaderia.
Leaves distributed along the culms.
Lemmas naked. Rachilla hairy---------- 26. Phragmites.
Lemmas hairy.
Rachilla naked---------- 24. Arundo.
Rachilla hairy---------- 27. Neyraudia.
3b. Low or rather tall grasses, rarely more than 1.5 m tall.
4a. Plants dioecious, perennial. Lemmas glabrous; grasses of salt or alkaline soils.
Plants low, creeping; spikelets obscure, scarcely differentiated from the short crowded rigid leaves---------- 18. Monanthochloë.
Plants erect from creeping rhizomes; spikelets in a narrow simple exserted panicle---------- 19. Distichlis.
4b. Plants not dioecious (except in a few species of *Poa* with villous lemmas and in an annual species of *Eragrostis*).
5a. Spikelets of two forms, sterile and fertile intermixed. Panicle dense, somewhat one-sided.
Fertile spikelets 2- or 3-flowered; sterile spikelets with numerous rigid awn-tipped glumes; panicle dense, spikelike--- 22. Cynosurus.
Fertile spikelets with 1 perfect floret, long-awned; sterile spikelets with many obtuse sterile lemmas; panicle branchlets short, nodding---------- 23. Lamarckia.
5b. Spikelets all alike in the same inflorescence.
6a. Lemmas 3-nerved, the nerves prominent, often hairy.
7a. Inflorescence a few-flowered head or capitate panicle overtopped by the leaves or partly concealed in them. Lemmas toothed or cleft; low plants of the arid regions.
Inflorescence hidden among the sharp-pointed leaves, not woolly; plants annual (Chlorideae)---------- 106. Munroa.
Inflorescence a capitate woolly panicle, not concealed; plants perennial.
Lemmas cleft either side of the midnerve to near the base, the lower two sterile, the third floret fertile, the fourth reduced to a 3-awned rudiment---------- 35. Blepharidachne.
Lemma 2-lobed but not deeply cleft, all fertile but the uppermost---------- 31. Triodia.

7b. Inflorescence an exserted open or spikelike panicle.
8a. Lemmas pubescent on the nerves or callus (except in *Triodia albescens*), the midnerve usually exserted as an awn or mucro.
Nerves glabrous. Callus densely hairy; lemmas firm; panicle large, diffuse---------- 17. REDFIELDIA.
Nerves hairy at least below, the lateral ones often conspicuously so.
Palea long-ciliate on the upper half---------- 32. TRIPLASIS.
Palea sometimes villous but not long-ciliate on the upper half. Perennials---------- 31. TRIODIA.
8b. Lemmas not pubescent on the nerves nor callus (the internerves sometimes pubescent), awnless.
Glumes longer than the lemmas; lateral nerves of lemma marginal, the internerves pubescent---------- 16. DISSANTHELIUM.
Glumes shorter than the lemmas; lateral nerves of lemma not marginal, the internerves glabrous.
Lemmas chartaceous; grain large, beaked, at maturity forcing the lemma and palea open---------- 15. DIARRHENA.
Lemmas membranaceous; if firm, the grain neither large nor beaked.
Spikelets subterete; palea longer than the lemma, bowed out below---------- 14. MOLINIA.
Spikelets compressed; palea not longer than the lemma, not bowed out below.
Lemmas truncate; spikelets 2-flowered 13. CATABROSA.
Lemmas acute or acuminate; spikelets 3- to many-flowered. Rachilla continuous, the paleas persistent after the fall of the lemmas (rachilla disarticulating in Sect. Cataclastos)---------- 12. ERAGROSTIS.
6b. Lemmas 5- to many-nerved, the nerves sometimes obscure.
Spikelets with 1 to 4 empty lemmas below the fertile florets; nerves obscure; lemmas firm---------- 20. UNIOLA.
Spikelets with no empty lemmas below the fertile florets; nerves usually prominent; lemmas membranaceous (firm in a few species of *Bromus* and *Festuca*).
Lemmas flabellate; glumes wanting; inflorescence dense, cylindric. Low annual---------- 33. ANTHOCHLOA.
Lemmas not flabellate; glumes present; inflorescence not cylindric.
Lemmas as broad as long, the margins outspread; florets closely imbricate, horizontally spreading---------- 11. BRIZA.
Lemmas longer than broad, the margins clasping the palea; florets not horizontally spreading.
Callus of florets bearded.
Lemmas erose at summit, awnless---------- 8. FLUMINEA.
Lemmas bifid at summit, awned---------- 29. SCHIZACHNE.
Callus not bearded (lemmas cobwebby at base in *Poa*).
Lemmas not erose (slightly in *Puccinellia*).
9a. Lemmas keeled on the back (somewhat rounded in *Poa scabrella* and its allies).
Spikelets strongly compressed, crowded in one-sided clusters at the ends of the stiff, naked panicle branches---------- 21. DACTYLIS.
Spikelets not strongly compressed, not crowded in one-sided clusters.
Lemmas awned from a minutely bifid apex (awnless or nearly so in *Bromus catharticus* and *B. brizaeformis*); spikelets large---------- 2. BROMUS.
Lemmas awnless; spikelets small---------- 10. POA.
9b. Lemmas rounded on the back (slightly keeled toward the summit in *Festuca* and *Bromus*).
Glumes papery; lemmas firm, strongly nerved, scarious-margined; upper florets sterile, often reduced to a club-shaped rudiment infolded by the broad upper lemmas. Spikelets tawny or purplish, usually not green---------- 28. MELICA.

Glumes not papery; upper florets not unlike the others.
Nerves of lemma parallel, not converging at summit or but slightly so.
Spikelets in racemes.
Racemes short, dense, overtopped by the leaves; spikelets awnless_____ 7. SCLEROCHLOA.
Racemes elongate, loose, exserted; spikelets awned or mucronate_____ 9. PLEUROPOGON.
Spikelets in open or contracted panicles.
Nerves prominent; plants usually rather tall, growing in woods or fresh-water marshes. 6. GLYCERIA.
Nerves faint; plants low, growing in saline soil. 5. PUCCINELLIA.
Nerves of lemma converging toward summit, the lemmas narrowed at apex.
Lemmas awned or awn-tipped from a minutely bifid apex (awnless in *B. brizaeformis*). 2. BROMUS.
Lemmas entire, pointed, awnless or awned from the tip (minutely toothed in *Festuca elmeri* and *F. gigantea*).
Spikelets awned (awnless in a few perennial species); lemmas pointed_____ 3. FESTUCA.
Spikelets awnless.
Second glume 5- to 9-nerved; spikelets mostly 1 cm or more long; lemmas broad, many-nerved, firm_____ 30. VASEYOCHLOA.
Second glume 1- to 3-nerved; spikelets smaller; lemmas 5-nerved, membranaceous, not pointed.
Spikelets on slender pedicels in compound panicles; perennials_____ 10. POA.
Spikelets on thick short pedicels in simple panicles; annual_____ 4. SCLEROPOA

TRIBE 3. HORDEAE

Spikelets 1- to several-flowered, sessile on opposite sides of a jointed or continuous axis forming symmetrical spikes (not one-sided, but spikelets sometimes turned to one side in some species).

This small but important tribe, found in the temperate regions of both hemispheres, includes our most important cereals, wheat, barley, and rye. The rachis is flattened or concave next to the spikelets, or in some genera is thickened and hollowed out, the spikelets being more or less enclosed in the hollows. In *Triticum* and its allies there is one spikelet at each node of the rachis; in *Hordeum* and its allies there are 2 or 3 at each node. In *Lolium* and its allies the spikelets are placed edgewise to the rachis, and the first or inner glume is suppressed except in the terminal spikelet. The rachis of the spikes disarticulates at maturity in several genera. In some species of *Elymus* and especially in *Sitanion* the glumes are very slender, extending into long awns, in the latter genus sometimes divided into several slender bristles. The spikes are rarely branched or compound, especially in *Elymus condensatus*. In this tribe the blades of the leaves bear on each side at the base a small appendage or auricle.

Key to the genera of Hordeae

1a. Spikelets solitary at each node of the rachis (rarely 2 in species of *Agropyron*, but never throughout).
2a. Spikelets 1-flowered, sunken in hollows in the rachis. Spikes slender, cylindric; low annuals.

Lemmas awned; florets lateral to the rachis---------- 50. SCRIBNERIA.
Lemmas awnless; florets dorsiventral to the rachis.
First glume wanting---------- 48. LEPTURUS.
First glume present, the pair standing in front of the spikelet. 49. PHOLIURUS.

2b. Spikelets 2- to several-flowered, not sunken in the rachis.
Spikelets placed edgewise to the rachis. First glume wanting except in the terminal spikelet---------- 47. LOLIUM.
Spikelets placed flatwise to the rachis.
Plants perennial---------- 39. AGROPYRON.
Plants annual.
Spikelets turgid or cylindric---------- 41. AEGILOPS.
Spikelets compressed.
Glumes ovate, 3-nerved---------- 40. TRITICUM.
Glumes subulate, 1-nerved---------- 42. SECALE.

1b. Spikelets more than 1 at each node of the rachis (solitary in part of the spike in some species of *Elymus*).
Spikelets 3 at each node of the rachis, 1-flowered, the lateral pair pediceled, usually reduced to awns---------- 46. HORDEUM.
Spikelets 2 at each node of the rachis, alike, 2- to 6-flowered.
Glumes wanting or reduced to 2 short bristles; spikelets horizontally spreading at maturity. Spikes very loose---------- 45. HYSTRIX.
Glumes usually equaling the florets (reduced in *Elymus interruptus*); spikelets appressed or ascending.
Rachis continuous (rarely tardily disarticulating); glumes broad or narrow, entire---------- 43. ELYMUS.
Rachis disarticulating at maturity; glumes subulate, extending into long awns, these and the awns of the lemmas making the spike very bristly---------- 44. SITANION.

TRIBE 4. AVENEAE

Spikelets 2- to several-flowered in open or contracted panicles, or rarely in racemes (solitary in *Danthonia unispicata*); glumes usually as long as or longer than the first lemma, commonly longer than all the florets; lemmas usually awned from the back or from between the teeth of a bifid apex, the awn usually bent, often twisted, the callus and rachilla joints usually villous.

A rather small tribe widely distributed in both warm and cool regions. In our genera the rachilla is prolonged beyond the upper floret as a slender stipe (except in *Aira*). The lemma is awnless or nearly so in *Schismus*, two species of *Trisetum*, one species of *Koeleria*, and in most of the species of *Sphenopholis*. *Koeleria* and *Sphenopholis* are placed in this tribe because they appear to be closely allied to *Trisetum* with which they agree in having oblanceolate glumes about as long as the first floret.

Key to the genera of Aveneae

Florets 2, one perfect, the other staminate.
Lower floret staminate, the awn twisted, geniculate, exserted. 58. ARRHENATHERUM.
Lower floret perfect, awnless; upper floret awned---------- 59. HOLCUS.

Florets 2 or more, all alike except the reduced upper ones.
Articulation below the glumes, the spikelets falling entire.
Lemmas, at least the upper, with a conspicuous bent awn; glumes nearly alike---------- 54. TRISETUM.
Lemmas awnless or (in *S. pallens*) the upper with a short awn; second glume much wider than the first---------- 53. SPHENOPHOLIS.
Articulation above the glumes, the glumes similar in shape.
Spikelets several-flowered. Lemmas bifid at apex, awned or mucronate between the lobes.

Spikelets 1 cm or more long; awns conspicuous, flat, bent.
60. DANTHONIA.
Spikelets not more than 5 mm long; awns minute or nearly obsolete.
51. SCHISMUS.
Spikelets 2-flowered, sometimes with a rudimentary third floret.
Spikelets large, the glumes more than 1 cm long---------- 57. AVENA.
Spikelets less than 1 cm long.
Lemmas keeled, the awn when present from above the middle.
Rachilla joints very short, glabrous or minutely pubescent; lemmas awnless or with a straight awn from a toothed apex.
52. KOELERIA.
Rachilla joints slender, villous; lemmas with a dorsal bent awn (awnless or nearly so in 2 species)---------- 54. TRISETUM.
Lemmas convex, awned from below the middle.
Rachilla prolonged behind the upper floret; lemmas truncate and erose-dentate at summit---------- 55. DESCHAMPSIA.
Rachilla not prolonged; lemmas tapering into 2 slender teeth.
56. AIRA.

TRIBE 5. AGROSTIDEAE

Spikelets 1-flowered, usually perfect, in open, contracted, or spikelike panicles, but not in true spikes nor in 1-sided racemes.

A large and important tribe, inhabiting more especially the temperate and cool regions. The articulation of the rachilla is usually above the glumes, the mature floret falling from the persistent glumes, but in a few genera the articulation is below the glumes, the mature spikelet falling entire (*Alopecurus*, *Cinna*, *Polypogon*, *Lycurus*, and *Limnodea*). The palea is small or wanting in some species of *Agrostis*. In a few genera the rachilla is prolonged behind the palea as a minute bristle, or sometimes as a more pronounced stipe (*Brachyelytrum*, *Limnodea*, *Cinna*, *Gastridium*, *Calamagrostis*, *Ammophila*, *Lagurus*, and a few species of *Agrostis*). In some genera the rachilla joint between the glumes and the lemma is slightly elongated, forming a hard stipe which remains attached to the mature fruit as a pointed callus. The callus is well marked in *Stipa* (especially in *S. spartea* and its allies) and in *Aristida*, the mature lemma being terete, indurate, and convolute, the palea wholly enclosed. In many genera the lemma is awned either from the tip or from the back, the awn being trifid in *Aristida*.

Key to the genera of Agrostideae

Glumes wanting. Low annual---------- 66. COLEANTHUS.
Glumes present (the first obsolete in *Muhlenbergia schreberi* and sometimes in *Brachyelytrum* and *Phippsia*).
1a. Articulation below the glumes, the spikelets falling entire.
Spikelets in pairs in a spikelike panicle, one perfect, the other staminate or neuter, the pair falling together---------- 71. LYCURUS.
Spikelets all alike.
Glumes long-awned---------- 70. POLYPOGON.
Glumes awnless.
Rachilla not prolonged behind the palea; panicle dense, spikelike; glumes united toward the base, ciliate on the keel.
69. ALOPECURUS.
Rachilla prolonged behind the palea; panicle narrow or open, not dense; glumes not united, not ciliate on the keel.
Panicle narrow; lemma with a slender bent twisted awn from the bifid apex---------- 68. LIMNODEA.
Panicle open, drooping; lemma with a minute straight awn just below the entire apex (rarely awnless)---------- 67. CINNA.
1b. Articulation above the glumes.
Fruit dorsally compressed, indurate, smooth and shining, awnless.
81. MILIUM.

Fruit laterally compressed or terete, awned or awnless.
2a. Fruit indurate, terete, awned, the nerves obscure; callus well developed, oblique, bearded.
Awn trifid, the lateral divisions sometimes short, rarely obsolete (when obsolete no line of demarcation between awn and lemma as in the next)---------- 85. Aristida.
Awn simple, a line of demarcation between the awn and the lemma.
Awn persistent, twisted and bent, several to many times longer than the fruit.
Edges of lemma overlapping (rarely only meeting), enclosing the palea; callus sharp-pointed, usually narrow and acuminate. 84. Stipa.
Edges of lemma not meeting, exposing the indurate sulcus of the palea, this projecting from the summit as a minute point; callus short, acutish---------- 83. Piptochaetium.
Awn deciduous, not twisted, sometimes bent, rarely more than 3 or 4 times as long as the plump fruit; callus short, usually obtuse. 82. Oryzopsis.
2b. Fruit thin or firm, but scarcely indurate, if firm, the nerves prominent or evident; callus not well developed.
3a. Glumes longer than the lemma (lemma equaling the glumes in certain species of *Agrostis*.)
Panicle feathery, capitate, nearly as broad as long; spikelets woolly. 74. Lagurus.
Panicle not feathery; spikelets not woolly.
Glumes compressed-carinate; panicle dense, cylindric or ellipsoid. 72. Phleum.
Glumes not compressed-carinate, not ciliate.
Glumes saccate at base; lemma long-awned; panicle contracted, shining---------- 73. Gastridium.
Glumes not saccate at base; lemma awned or awnless; panicle open or contracted.
Florets bearing a tuft of hairs at the base from the short callus, the hairs at least half as long as the lemma; palea present. 61. Calamagrostis.
Florets without hairs at the base or with short hairs, rarely as much as half the length of the lemma (*Agrostis hallii*); palea usually small or wanting---------- 64. Agrostis.
3b. Glumes not longer than the lemma, usually shorter (the awn tips longer in *Muhlenbergia racemosa*).
Lemma awned from the tip or mucronate, 3- to 5-nerved (lateral nerves obscure in *Muhlenbergia repens*).
Rachilla prolonged behind the palea; floret stipitate. 80. Brachyelytrum.
Rachilla not prolonged; floret not stipitate-- 75. Muhlenbergia.
Lemma awnless or awned from the back.
Florets bearing a tuft of hairs at the base from the short callus; lemma and palea chartaceous, awnless.
Panicles spikelike; rachilla prolonged-------- 62. Ammophila.
Panicles open; rachilla not prolonged------ 63. Calamovilfa.
Florets without hairs at base.
Nerves of lemma densely silky-------- 77. Blepharoneuron.
Nerves of lemma not silky.
Caryopsis at maturity falling from the lemma and palea; seed loose in the paricarp, this usually opening when ripe; lemma 1-nerved.
Inflorescence capitate in the axils of broad bracts. 78. Crypsis.
Inflorescence an open or contracted panicle. 76. Sporobolus.
Caryopsis not falling from the lemma and palea, remaining permanently enclosed in them; seed adnate to the pericarp.
Panicles few-flowered, slender, rather loose; glumes minute, unequal, the first often wanting. Low arctic-alpine perennial---------- 65. Phippsia.

Panicles many-flowered, spikelike; glumes well developed, about equal.
Panicle short, partly enclosed in the sheath; low annual. 79. HELEOCHLOA.
Panicle elongate; perennial..... 75. MUHLENBERGIA.

TRIBE 6. ZOYSIEAE

Spikelets subsessile in short spikes of 2 to 5 (single in *Zoysia*), each spike falling entire from the continuous axis, usually 1-flowered, all perfect, or perfect and staminate together in the same spike; glumes usually firmer than the lemma and palea, sometimes awned, the lemma awnless.

This small and unimportant tribe is known also as Nazieae. In *Zoysia* the spikelets are single and have only one glume, this coriaceous, much firmer than the lemma and palea, the palea sometimes obsolete.

Key to the genera of Zoysieae

Spikelets single; first glume wanting..... 87. ZOYSIA.
Spikelets in clusters of 2 to 5; first glume present.
Spikelets bearing hooked spines on the second glume, the group forming a little bur..... 86. TRAGUS.
Spikelets not bearing hooked spines, mostly cleft and awned.
Groups of spikelets erect, the inflorescence not 1-sided..... 88. HILARIA.
Groups of spikelets nodding along one side of the delicate axis. 89. AEGOPOGON.

TRIBE 7. CHLORIDEAE

Spikelets 1- to several-flowered, in 2 rows on one side of a continuous rachis, forming 1-sided spikes or spikelike racemes, these solitary, digitate, or racemose along the main axis.

A large and rather important tribe, confined mostly to warm regions. The group is heterogeneous, the only common character of the genera (aside from the characters that place them in Festucoideae) being the arrangement of the spikelets in 1-sided spikes. *Chloris* and the allied genera form a coherent group, in which the spikelet consists of 1 perfect floret and, above this, 1 or more modified or rudimentary florets. *Leptochloa*, *Eleusine*, and their allies, with several-flowered spikelets, are more nearly related to certain genera of Festuceae. The spike is reduced to 2 or 3 spikelets or even to 1 spikelet and is sometimes deciduous from the main axis (*Cathestecum* and Sect. Atheropogon of *Bouteloua*). In *Ctenium* there are 2 sterile florets below the perfect one.

Key to the genera of Chlorideae

Plants monoecious or dioecious. Low stoloniferous perennial.. 107. BUCHLOË.
Plants with perfect flowers.
1a. Spikelets with more than 1 perfect floret.
Inflorescence a few-flowered head or capitate panicle hidden among the sharp-pointed leaves. Low spreading annual..... 106. MUNROA.
Inflorescence exserted.
Spikes solitary, the spikelets distant, appressed, several-flowered. 92. TRIPOGON.
Spikes more than 1 (sometimes 1 in depauperate *Eleusine*).
Spikes numerous, slender, racemose on an elongate axis.
Rachilla and callus of floret glabrous or nearly so; glumes acute, less than 5 mm long..... 90. LEPTOCHLOA.
Rachilla and callus of floret strongly pilose; glumes long-acuminate, about 1 cm long..... 91. TRICHONEURA.
Spikes few, digitate or nearly so.
Rachis of spike extending beyond the spikelets. 94. DACTYLOCTENIUM.
Rachis not prolonged..... 93. ELEUSINE.

1b. Spikelets with only 1 perfect floret, often with additional imperfect florets above or below.
2a. Spikelets without additional modified florets, the rachilla sometimes prolonged.
Rachilla articulate below the glumes, the spikelets falling entire.
Glumes unequal, narrow---------- 99. SPARTINA.
Glumes equal, broad, boat-shaped---------- 98. BECKMANNIA.
Rachilla articulate above the glumes.
Spikes digitate; rachilla prolonged---------- 95. CYNODON.
Spikes racemose along the main axis; rachilla not prolonged.
Spikes slender, divaricate, the main axis elongating and becoming loosely spiral in fruit---------- 97. SCHEDONNARDUS.
Spikes short and rather stout, appressed, the axis unchanged in fruit. 96. WILLKOMMIA.
2b. Spikelets with 1 or more modified florets above the perfect one.
Spikelets with 2 sterile florets below the perfect one; second glume bearing a squarrose spine on the back; spike single, arcuate. 100. CTENIUM.
Spikelets with no sterile florets below the perfect one; second glume without a squarrose spine; spikes usually several.
Spikes digitate or nearly so.
Fertile lemma 1-awned or awnless---------- 102. CHLORIS.
Fertile lemma 3-awned---------- 103. TRICHLORIS.
Spikes racemose along the main axis.
Spikelets distant, appressed; spikes slender, elongate. 101. GYMNOPOGON.
Spikelets approximate or crowded, not appressed; spikes usually short and rather stout.
Spikelets 3 in each spike, the 2 lateral staminate or rudimentary; spikes falling entire---------- 105. CATHESTECUM.
Spikelets 2 to many (rarely 1) in each spike, all alike; spikes falling entire or persistent, the florets falling. 104. BOUTELOUA.

TRIBE 8. PHALARIDEAE

Spikelets with one perfect terminal floret and, below this, a pair of staminate or neuter florets (one sometimes obsolete in *Phalaris*).

A small tribe of about six genera, only three of which are found in the United States. In *Phalaris* the lower florets are reduced to minute scalelike lemmas closely appressed to the edges of the fertile floret. In *Hierochloë* the lateral florets are staminate and as large as the fertile floret.

Key to the genera of Phalarideae

Lower florets staminate; spikelets brown and shining---------- 108. HIEROCHLOË.
Lower florets neuter; spikelets green or yellowish.
Lower florets reduced to small awnless scalelike lemmas; spikelets much compressed laterally---------- 110. PHALARIS.
Lower florets consisting of awned hairy sterile lemmas exceeding the fertile floret; spikelet subterete---------- 109. ANTHOXANTHUM.

TRIBE 9. ORYZEAE

Spikelets 1-flowered, perfect, strongly laterally compressed, paniculate; glumes reduced or wanting; palea apparently 1-nerved; stamens 6.

A small tribe whose affinities are not evident. It includes rice, the important food plant.

Key to the genera of Oryzeae

Glumes minute; lemma often awned---------- 111. ORYZA.
Glumes wanting; lemma awnless---------- 112. LEERSIA.

TRIBE 10. ZIZANIEAE

Spikelets unisexual, the pistillate terete or nearly so; glumes shorter than the lemma, usually one or both obsolete, the pedicel disarticulating below the spikelet. Glumes well developed in *Pharus*, a tropical genus placed in this tribe provisionally.

A small tribe of uncertain affinities, aquatic or subaquatic grasses (except *Pharus*) of no economic importance except the Indian rice (*Zizania*).

Key to the genera of Zizanieae

Blades elliptic, 2 to 4 cm wide ..... 117. PHARUS.
Blades much longer than wide.
Culms slender; plants low; staminate and pistillate spikelets borne in separate inflorescences.
Inflorescence a few-flowered raceme; plants not stoloniferous ..... 116. HYDROCHLOA.
Inflorescence a panicle; plants stoloniferous ..... 115. LUZIOLA.
Culms robust; plants tall; staminate and pistillate spikelets borne in the same panicle.
Pistillate spikelets on the ascending upper branches, the staminate on the spreading lower branches of the panicle; plants annual or perennial ..... 113. ZIZANIA.
Pistillate spikelets at the ends, the staminate below on the same branches of the panicle; plants perennial ..... 114. ZIZANIOPSIS.

TRIBE 11. MELINIDEAE

Spikelets disarticulating below the glumes, these very unequal, the first minute, the second and the sterile lemma equal, membranaceous, strongly nerved, the latter bearing a slender awn from the notched summit; fertile lemma and palea thinner in texture, awnless.

A tribe of about a dozen genera represented in the United States by an introduced species, *Melinis minutiflora*.

TRIBE 12. PANICEAE

Spikelets with one perfect terminal floret and below this a sterile floret and two glumes; fertile lemma and palea indurate or at least firmer than the glumes and sterile lemma, a lunate line of thinner texture at the back just above the base, the rootlet protruding through this at germination; articulation below the spikelet.

A large tribe, confined mostly to warm regions, and containing relatively few economic species. The first glume is wanting in some genera, such as *Paspalum*, and rarely the second glume also (*Reimarochloa*). The spikelets are usually awnless, but the glumes and sterile lemma are awned in *Echinochloa* and *Oplismenus*, and the second glume and sterile lemma in *Tricholaena*. In *Eriochloa* and in some species of *Brachiaria* the fertile lemma is awn-tipped. In *Setaria* there are, beneath the spikelet, one or more bristles, these representing sterile branchlets. In *Pennisetum* similar bristles form an involucre, falling with the spikelet. In *Cenchrus* the bristles are united, forming a bur. The spikelets are of two kinds in *Amphicarpum*, aerial and subterranean. The culms are woody and perennial in *Lasiacis* and *Olyra*.

Key to the genera of Paniceae

Spikelets of two kinds.
Spikelets all perfect, but those of the aerial panicle not perfecting grains, the fruitful spikelets borne on subterranean branches ..... 138. AMPHICARPUM.
Spikelets unisexual, the pistillate above, the staminate below on the branches of the same panicle. Blades broad, elliptic ..... 139. OLYRA.

Spikelets all of one kind.
Spikelets sunken in the cavities of the flattened corky rachis.
123. STENOTAPHRUM.
Spikelets not sunken in the rachis.
1a. Spikelets subtended or surrounded by 1 to many distinct or more or less connate bristles, forming an involucre.
Bristles persistent, the spikelets deciduous---- 135. SETARIA.
Bristles falling with the spikelets at maturity.
Bristles not united at base, slender, often plumose-- 136. PENNISETUM.
Bristles united into a burlike involucre, the bristles retrorsely barbed.
137. CENCHRUS.
1b. Spikelets not subtended by bristles.
Glumes or sterile lemma awned (awn short and concealed in the silky hairs of the spikelet in *Tricholaena;* awn reduced to a point in *Echinochloa colonum*).
Inflorescence paniculate; spikelets silky---- 134. TRICHOLAENA.
Inflorescence of unilateral simple or somewhat compound racemes along a common axis; spikelets smooth or hispid, not silky.
Blades lanceolate, broad, thin; culms creeping--- 132. OPLISMENUS.
Blades long, narrow; culms not creeping---- 133. ECHINOCHLOA.
Glumes and sterile lemma awnless.
2a. Fruit cartilaginous-indurate, flexible, usually dark colored, the lemma with more or less prominent white hyaline margins, these not inrolled.
Spikelets covered with long silky hairs, arranged in racemes, these paniculed---- 120. TRICHACHNE.
Spikelets glabrous or variously pubescent but not long-silky (somewhat silky in *Digitaria villosa*).
Spikelets in slender racemes more or less digitate at the summit of the culms---- 121. DIGITARIA.
Spikelets in panicles.
Fruiting lemma boat-shaped; panicles narrow.
119. ANTHAENANTIA.
Fruiting lemma convex; panicles diffuse---- 122. LEPTOLOMA.
2b. Fruit chartaceous-indurate, rigid.
Spikelets placed with the back of the fruit turned away from the rachis of the racemes, usually solitary (not in pairs).
First glume and the rachilla joint forming a swollen ringlike callus below the spikelet---- 124. ERIOCHLOA.
First glume present or wanting, not forming a ringlike callus below the spikelet.
First glume present (next to the axis); racemes racemose along the main axis---- 125. BRACHIARIA.
First glume wanting; racemes digitate or subdigitate.
126. AXONOPUS.
Spikelets placed with the back of the fruit turned toward the rachis (first glume, when present, away from the axis) of the spikelike racemes, or pedicellate in panicles.
Fruit long-acuminate; both glumes wanting- 127. REIMAROCHLOA.
Fruit not long-acuminate; at least one glume present.
First glume typically wanting; spikelets plano-convex, subsessile in spikelike racemes---- 128. PASPALUM.
First glume present; spikelets usually in panicles.
Second glume inflated-saccate, this and the sterile lemma much exceeding the stipitate fruit---- 131. SACCIOLEPIS.
Second glume not inflated-saccate.
Culms woody, bamboolike; fruit with a tuft of down at the apex---- 130. LASIACIS.
Culms herbaceous; no tuft of down at the apex of the fruit.
129. PANICUM.

TRIBE 13. ANDROPOGONEAE

Spikelets in pairs along a rachis, the usual arrangement being one of the pair sessile and fertile, the other pedicellate and staminate or neuter, rarely wanting, only the pedicel present; fertile spikelet consisting of one perfect terminal floret and, below this, a staminate or neuter floret, the lemmas thin or hyaline, and two awnless glumes, one or usually both firm or indurate.

A large tribe, confined mostly to warm regions. The rachis is usually jointed, disarticulating at maturity, with the spikelets attached to the joints. In a few genera it is thickened. Sometimes the racemes are shortened to 1 or 2 joints and borne on branches, the whole forming a panicle (as in *Sorghum* and *Sorghastrum*) instead of a series of racemes. In a few genera the spikelets of the pair are alike. In *Trachypogon* the fertile spikelet is pedicellate and the sterile one nearly sessile. The most important economic plants in this tribe are sugarcane and sorghum.

Key to the genera of Andropogoneae

1a. Spikelets all perfect, surrounded by a copious tuft of soft hairs.
Rachis continuous, the spikelets falling; the spikelets of the pair unequally pedicellate.
Racemes in a narrow spikelike panicle; spikelets awnless--- 140. IMPERATA.
Racemes in a broad fan-shaped panicle; spikelets awned.
141. MISCANTHUS.
Rachis breaking up into joints at maturity with the spikelets attached; one spikelet sessile, the other pedicellate.
Spikelets awnless---------- 142. SACCHARUM.
Spikelets awned---------- 143. ERIANTHUS.
1b. Spikelets unlike, the sessile perfect, the pedicellate sterile (sessile spikelet staminate, pedicellate spikelet perfect in *Trachypogon*).
2a. Pedicel thickened, appressed to the thickened rachis joint (at least parallel to it) or adnate to it; spikelets awnless, appressed to the joint.
Rachis joint and pedicel adnate. Annuals.
Perfect spikelet globose; sterile spikelet conspicuous.
155. HACKELOCHLOA.
Perfect spikelet oblong; sterile spikelet minute----- 153. ROTTBOELLIA.
Rachis joint and pedicel distinct, the sessile spikelet appressed to them, its first glume lanceolate.
Racemes subcylindric; rachis joints and pedicels glabrous, much thicker at the summit, the spikelets sunken in the hollow below; sterile spikelet rudimentary---------- 154. MANISURIS.
Racemes flat; rachis joints and pedicels woolly, not much thicker at the summit; sterile spikelet staminate or neuter----- 152. ELYONURUS.
2b. Pedicel not thickened (if slightly so the spikelets awned), neither appressed nor adnate to the rachis joint, this usually slender; spikelets usually awned.
3a. Fertile spikelet with a hairy-pointed callus, formed of the attached supporting rachis joint or pedicel; awns strong.
Racemes reduced to a single joint, long-peduncled in a simple open panicle---------- 149. RHAPHIS.
Racemes of several to many joints, single.
Primary spikelet subsessile, sterile, persistent on the continuous axis after the fall of the fertile pedicellate spikelet_ 151. TRACHYPOGON.
Primary spikelet sessile, fertile; pedicellate spikelet sterile. Lower few to several pairs of spikelets all staminate or neuter.
150. HETEROPOGON.
3b. Fertile spikelet without a callus (a short callus in *Hyparrhenia*), the rachis disarticulating immediately below the spikelet; awns slender.
Blades ovate. Annual---------- 144. ARTHRAXON.
Blades narrow, elongate.
Racemes of several to many joints, solitary, digitate, or aggregate in panicles.
Lower pair of spikelets like the others of the raceme.
145. ANDROPOGON.
Lower pair of spikelets sterile, awnless. Racemes in pairs on slender flexuous peduncles---------- 146. HYPARRHENIA.
Racemes reduced to one or few joints, these mostly peduncled in a subsimple or compound panicle.
Pedicellate spikelets staminate---------- 147. SORGHUM.
Pedicellate spikelets wanting, the pedicel only present.
148. SORGHASTRUM.

TRIBE 14. TRIPSACEAE

Spikelets unisexual, the staminate in pairs, or sometimes in threes, 2-flowered, the pistillate usually single, 2-flowered, the lower floret sterile, embedded in hollows of the thickened articulate axis and falling attached to the joints, or enclosed in a thickened involucre or sheath or, in *Zea*, crowded in rows on a thickened axis (cob); glumes membranaceous or thick and rigid, awnless; lemmas and palea hyaline, awnless. Plants monoecious.

This small tribe of seven genera is scarcely more than a subtribe of Andropogoneae, differing chiefly in the total suppression of the sterile spikelet of a pair, the fertile spikelet being pistillate only and solitary; staminate spikelets paired. It is also known as Maydeae.

Key to the genera of Tripsaceae

Staminate and pistillate spikelets in separate inflorescences, the first in a terminal tassel, the second in the axils of the leaves.
- Pistillate spikes distinct, the spikelets embedded in the hardened rachis, this disarticulating at maturity ..... 158. EUCHLAENA.
- Pistillate spikes grown together forming an ear, the grains at maturity much exceeding the glumes ..... 159. ZEA.

Staminate and pistillate spikelets in separate portions of the same spike, the pistillate below.
- Spikes short, the 1- or 2-flowered pistillate portion enclosed in a beadlike sheathing bract ..... 156. COIX.
- Spikes many-flowered, the pistillate portion breaking up into several 1-seeded joints; no beadlike sheathing bract ..... 157. TRIPSACUM.

DESCRIPTIONS OF GENERA AND SPECIES

TRIBE 1. BAMBUSEAE

1. ARUNDINÁRIA Michx. CANE

Spikelets few- to many-flowered, large, compressed, the rachilla disarticulating above the glumes and between the florets; glumes unequal, shorter than the lemmas, the first sometimes wanting; lemmas acute, acuminate, or mucronate, faintly many-nerved; palea about as long as the lemma, prominently 2-keeled; stamens 6. Shrubs or tall reeds, with woody perennial branching culms, flat petiolate blades, articulate with the sheaths, and loose racemes or panicles. Type species, *Arundinaria macrosperma* Michx. (*A. gigantea.*) Name from Latin *Arundo*, a reed.

Panicles on leafy branches; culms as much as 10 m tall ..... 1. A. GIGANTEA.
Panicles on leafless shoots from creeping rhizomes ..... 2. A. TECTA.

1. Arundinaria gigantéa (Walt.) Chapm. SOUTHERN CANE. (Fig. 1.) Culms as much as 10 m tall, erect from stout rhizomes; sheaths bearing several bristles at the summit on each side, these disappearing with age, the collar prominent, pubescent; blades oblong-lanceolate to linear-lanceolate, rounded to a somewhat cuneate petiole, acuminate, finely tessellate with numerous cross veins, sharply serrulate on the margin, 10 to 20 cm long, mostly 1 to 2 cm wide or on vigorous shoots as much as 3 cm wide; flowering branchlets in fascicles on the main culm or short branches, their sheaths bladeless or nearly so, the racemes or simple panicles 1- to several-flowered; spikelets 3 to 7 cm long, mostly 8- to 12-flowered; glumes distant; lemmas pubescent, at least toward base, or glabrescent, acuminate, about 2 cm long. 2ℓ (*A. macrosperma* Michx.)—Growing in colonies,

FIGURE 1.—*Arundinaria gigantea*, × 1. (Chase 5880, Va.)

sometimes over large areas called canebrakes, common in the lowlands of the larger rivers, Virginia to southern Ohio and Illinois, south to Florida, eastern Texas, and Oklahoma (fig. 2). The species flowers at infrequent intervals and then over a wide area simultaneously. Livestock eagerly eat the young plants, leaves, and seeds, and canebrakes furnish much forage. The young shoots are sometimes used as a pot herb. The culms are used for fishing rods, pipestems, baskets, mats, and a variety of other purposes. Early travelers speak of the abundance of this species and state that the culms may be as much as 2 or even 3 inches in diameter. It is said that the plants are easily destroyed by the continuous grazing of cattle and by the rooting of swine.

2. Arundinaria técta (Walt.) Muhl. SMALL CANE. (Fig. 3.) Culms usually not more than 2 m tall, from stout rhizomes; racemes produced on leafless or nearly leafless shoots from the base of the plant or from creeping rhizomes; otherwise like the preceding. 2—Coastal Plain, Maryland (Stony Run) to Florida and Louisiana (fig. 4). Nuttall reports this (under the name *Miegia pumila*) from what is now southeastern Oklahoma. Also called switch cane. This species may be only a small form or variety of *A. gigantea*.

Several species of bamboos are cultivated for ornament in parks and gardens, especially in Florida and California. Descriptions of these may be found in L. H. Bailey's Standard Cyclopedia of Horticulture and in Hortus (Hortus, L. H. and E. Z. Bailey, 1930). They belong to the genera *Arundinaria, Bambusa, Cephalostachyum, Chusquea, Dendrocalamus, Phyllostachys, Sasa*, and *Thamnocalamus*. One of the commonest of the cultivated species is *Sasa japonica* (Sieb. and Zucc.) Makino (*Arundinaria japonica* Sieb. and Zucc.). Growing in dense colonies, 2 to 3 m tall with vigorous rhizomes; branches cylindric; blades evergreen, 10 to 20 cm long, 2 to 5 cm wide.

FIGURE 2.—Distribution of *Arundinaria gigantea*.

The genus *Phyllostachys* may be distinguished by the branches flattened on one side. *P. aurea* A. and C. Riviere is frequent; branches yellowish, often bright yellow, the lower internodes very short; plant 3 to 5 m tall.

TRIBE 2. FESTUCEAE

2. BRÓMUS L. BROMEGRASS

Spikelets several- to many-flowered, the rachilla disarticulating above the glumes and between the florets; glumes unequal, acute, the first 1- to 3-nerved, the second usually 3- to 5-nerved; lemmas convex on the back or keeled, 5- to 9-nerved, 2-toothed, awned from between the teeth or awnless; palea usually shorter than the lemma, ciliate on the keels. Low or rather tall annuals or perennials with closed sheaths, usually flat blades, and open or contracted panicles of large spikelets. Standard species, *Bromus sterilis* (type species, *B. secalinus*). Name from *bromos*, an ancient Greek name for the oat, from broma, food.

The native perennial species of bromegrass form a considerable portion of the forage in open woods of the mountain regions of the Western United States. *Bromus carinatus*, California brome, and

FIGURE 3.—*Arundinaria tecta.* Flowering shoot and leafy shoot, × ½; spikelet and floret, × 2. (Chase 5881, Va.)

its more eastern form, *B. marginatus*, are abundant from the Rocky Mountains to the Pacific coast. Before maturity, they are relished by all classes of stock. Horses and sheep are particularly fond of the seed heads. *Bromus anomalus*, *B. pumpellianus*, and *B. ciliatus*, of the Rocky Mountain region, are abundant up to 10,000–11,000 feet altitude, and are of first rank for all classes of stock. Several other species are nutritious but are usually not abundant enough to be of importance in the grazing regions. The most important species agronomically is smooth brome, *B. inermis*, a native of Europe, which is cultivated for hay and pasture in the northern part of the Great Plains. (See p. 39.) It is more drought-resistant than timothy and can be grown farther west on the plains, but does not thrive south of central Kansas. It is recommended for holding canal banks. Also called smooth, awnless, and Hungarian brome. Rescue grass, *B. catharticus*, is cultivated for winter forage in the Southern States from North Carolina to Texas and in the coast district of southern California.

The annuals are weedy species introduced mostly from Europe. The best known of these is chess, *Bromus secalinus*, a weed of waste places sometimes infesting grain fields. Formerly it was believed by the credulous that under certain conditions wheat changed into chess or "cheat." Chess in a wheat field is due to chess seed in the soil or in the wheat sown. This species is utilized for hay in places in Washington, Oregon, and Georgia. On the Pacific coast the annual bromegrasses cover vast areas of open ground at lower altitudes where they form a large part of the forage on the winter range. They mature in spring or early summer and become unpalatable. Those of the section Eubromus are, at maturity, a serious pest. The narrow, sharp-pointed minutely barbed florets (or fruits) with their long rough awns work into the eyes, nostrils, and mouths of stock, causing inflammation and often serious injury. Sometimes the intestines are pierced, and death results. On the Pacific coast, *B. rigidus*, the chief offender, is called ripgut grass by stockmen, and the name is sometimes applied to other species of the section.

FIGURE 4.—Distribution of *Arundinaria tecta*.

Spikelets strongly flattened, the lemmas compressed-keeled. Section 1. CERATOCHLOA.

Spikelets terete before anthesis or somewhat flattened, but the lemmas not compressed-keeled.

Plants perennial ..... Section 2. BROMOPSIS.

Plants annual. Introduced, mostly from Europe.

Awn straight or divaricate, sometimes minute or obsolete, not twisted and geniculate; teeth of the lemma sometimes slender but not aristate.

Lemmas broad, rounded above, not acuminate, the teeth mostly less than 1 mm long ..... Section 3. BROMIUM.

Lemmas narrow, with a sharp callus, gradually acuminate, bifid, the teeth 2 to 5 mm long. Awns usually more than 1.5 cm long. Section 4. EUBROMUS.

Awn geniculate, twisted below; teeth of the lemma aristate. Approaches *Trisetum* ..... Section 5. NEOBROMUS.

Section 1. Ceratochloa

Lemmas awnless or nearly so ..... 1. B. CATHARTICUS.

Lemmas awned, the awn more than 3 mm long.

Panicle branches elongate, slender, drooping, bearing 1 or 2 large spikelets at the end, the lowermost naked for as much as 10 to 15 cm. Sheaths smooth; Washington ..... 2. B. SITCHENSIS.

Panicle branches not greatly elongated.
Panicle branches ascending, rather stiff, naked below, bearing 1 or 2 large spikelets. Washington ..... 3. B. ALEUTENSIS.
Panicle branches short and ascending or longer and drooping, with some short branches at the base.
Blades canescent, densely pilose, narrow, often involute ..... 4. B. BREVIARISTATUS.
Blades not canescent, glabrous or somewhat pilose, usually more than 3 mm wide ..... 5. B. CARINATUS.

Section 2. Bromopsis

1a. Creeping rhizomes present; lemmas awnless or short-awned; panicle erect, somewhat open, the branches ascending.
Lemmas glabrous ..... 6. B. INERMIS.
Lemmas pubescent near the margins ..... 7. B. PUMPELLIANUS.
1b. Creeping rhizomes wanting (base of culm decumbent in *B. laevipes*).
2a. Panicle narrow, the branches erect.
Lemmas glabrous or evenly scabrous ..... 8. B. ERECTUS.
Lemmas appressed-pubescent on the margins and lower part. ..... 9. B. SUKSDORFII.
2b. Panicle open, the branches spreading or drooping.
3a. Lemmas glabrous.
Blades broad and lax, more than 5 mm, at least some of them 10 mm, wide. (var. *laeviglumis*) ..... 15. B. CILIATUS.
Blades narrow, not more than 6 mm wide ..... 18. B. TEXENSIS.
3b. Lemmas pubescent.
4a. Lemmas pubescent along the margin and on lower part of the back, the upper part glabrous.
First glume 3-nerved; plant pale or glaucous. Culms decumbent at base. ..... 13. B. LAEVIPES.
First glume 1-nerved, or only faintly 3-nerved near the base; plants dark green.
Ligule prominent, 3 to 5 mm long; lemmas narrow; awn usually more than 5 mm long ..... 14. B. VULGARIS.
Ligule inconspicuous, about 1 mm long; lemmas broad; awn 3 to 5 mm long ..... 15. B. CILIATUS.
4b. Lemmas pubescent rather evenly over the back, usually more densely so along the lower part of the margin.
Panicle branches short, stiffly spreading; blades short, mostly on lower part of culm ..... 10. B. ORCUTTIANUS.
Panicle branches lax or drooping; blades along the culm, mostly elongate.
Panicle small, drooping, usually not more than 10 cm long. Spikelets densely and conspicuously pubescent.
Sheaths and blades sparsely pilose to subglabrous; blades mostly 2 to 4 mm wide (rarely 5 to 6 mm) ..... 19. B. ANOMALUS.
Sheaths and blades (except uppermost in some) conspicuously pubescent; blades 5 to 10 mm wide ..... 20. B. KALMII.
Panicle larger, erect, the branches more or less drooping. Blades mostly wide and lax.
Ligule 3 to 4 mm long; blades pilose above, scabrous or smooth beneath; panicle large, open, the slender branches long, drooping ..... 12. B. PACIFICUS.
Ligule short; blades pubescent or pilose on both surfaces, or glabrous or scabrous.
Blades densely short-pubescent on both surfaces. ..... 11. B. GRANDIS.
Blades more or less pilose or glabrous.
Sheaths, at least the lower, retrorsely pilose; blades mostly more than 5 mm wide.
Sheaths shorter than the internodes; nodes 4 to 6. ..... 16. B. PURGANS.
Sheaths longer than the internodes; nodes 10 to 20. ..... 17. B. LATIGLUMIS.
Sheaths glabrous; blades mostly less than 5 mm wide. ..... 21. B. FRONDOSUS.

Section 3. Bromium

Panicle contracted, rather dense, the branches erect or ascending.
Lemmas glabrous---- 27. B. RACEMOSUS.
Lemmas pubescent.
Spikelets compressed; lemmas rather thin and narrow- 26. B. MOLLIFORMIS.
Spikelets turgid; lemmas rather thick, broader---- 25. B. MOLLIS.
Panicle open, the branches spreading.
Awn short or wanting; lemmas obtuse, inflated (see also short-awned forms of *B. secalinus*)---- 22. B. BRIZAEFORMIS.
Awn well developed.
Sheaths glabrous---- 23. B. SECALINUS.
Sheaths pubescent.
Branches of the panicle rather stiffly spreading or drooping, not flexuous; awn straight---- 24. B. COMMUTATUS.
Branches slender, lax or flexuous.
Panicle 8 to 11 cm (rarely to 15 cm) long; branches and pedicels conspicuously flexuous or curled; lemmas pubescent- 30. B. ARENARIUS.
Panicle 15 to 25 cm long (smaller in depauperate specimens), the long branches spreading or drooping, somewhat flexuous but usually not curled; lemmas glabrous or scaberulous.
Palea distinctly shorter than its lemma; awn flexuous, somewhat divergent in drying; spikelets rather turgid- 28. B. JAPONICUS.
Palea about as long as its lemma; awn straight or nearly so in drying; spikelets thinner and flatter, scarcely turgid- 29. B. ARVENSIS.

FIGURE 5.—*Bromus catharticus*, × 1. (Peebles, Harrison, and Kearney 1271, Ariz.)

Section 4. Eubromus

Panicle contracted, erect; awn 12 to 20 mm long.
Culms pubescent below the dense panicle---- 33. B. RUBENS.
Culms glabrous below the scarcely dense panicle---- 34. B. MADRITENSIS.
Panicle open, the branches spreading.
Second glume usually less than 1 cm long; pedicels capillary, flexuous. 35. B. TECTORUM.
Second glume more than 1 cm long; pedicels sometimes flexuous but not capillary.
Awn about 2 cm long; first glume 8 mm long---- 32. B. STERILIS.
Awn 3 to 5 cm long; first glume about 15 mm long---- 31. B. RIGIDUS.

Section 5. Neobromus

A single species---- 36. B. TRINII.

SECTION 1. CERATÓCHLOA (Beauv.) Griseb.

Annuals, biennials, or perennials; spikelets large, distinctly compressed; glumes and lemmas keeled, rather firm.

1. Bromus cathárticus Vahl. RESCUE GRASS. (Fig. 5.) Annual or biennial; culms erect to spreading, as much as 100 cm tall; sheaths glabrous or pubescent; blades narrow, glabrous or sparsely pilose; panicle open, as much as 20 cm long, the branches as much as 15 cm long, naked at base, in small plants the panicles reduced to a raceme of a few appressed short-pediceled spikelets; spikelets 2 to 3 cm long, 6- to 12-flowered; glumes acuminate, about 1 cm long; lemmas glabrous, scabrous, or sometimes pubescent, acuminate, 1.5 cm long, closely overlapping, concealing the short rachilla joints, awnless or with an awn 1 to 3 mm long; palea two-thirds as long as the lemma. ⊙ (*B. unioloides* H. B. K.)—Cultivated in the Southern States as a winter forage grass. Escaped from cultivation or sparingly introduced in waste places throughout the Southern States and rarely northward (fig. 6). Known also as Schrader's bromegrass.

FIGURE 6.—Distribution of *Bromus catharticus*.

FIGURE 7.—*Bromus sitchensis*, × 1. (Piper 3013, Alaska.)

2. Bromus sitchénsis Trin. (Fig. 7.) Stout smooth perennial; culms 120 to 180 cm tall; sheaths glabrous; blades elongate, 7 to 12 mm wide, sparsely pilose on the upper surface; panicles large, lax, drooping, 25 to 35 cm long, the lower branches (2 to 4) as much as 20 cm

long, naked below for as much as 10 or 15 cm, few-flowered; spikelets 2.5 to 3.5 cm long, 6- to 12-flowered, the rachilla joints longer than in *B. catharticus*, exposed at anthesis; lemmas scabrous, sometimes hirtellous toward base; awn 5 to 10 mm long. ♃ —Woods and banks near the coast, Washington to Alaska.

3. Bromus aleutensis Trin. (Fig. 8.) Culms rather stout, erect from a usually decumbent base, 50 to 100 cm tall; sheaths sparsely retrorse-pilose or glabrous; blades sparsely pilose, 5 to 10 mm wide; panicle erect, loose, 10 to 20 cm long, the branches rather stiffly ascending, bearing 1 or 2 (rarely 3) spikelets, the lower as much as 10 cm long; spikelets 2.5 to 3.5 cm long, 3- to 6-flowered; glumes subequal, the first 3-nerved, the second 5- or indistinctly 7-nerved; lemmas broadly lanceolate, 7-nerved, scarious-margined, smooth to scabrous-pubescent, about 15 mm long; awn mostly about 1 cm long. ♃ —Open ground, Aleutian Islands to the Olympic Mountain region.

FIGURE 8.—*Bromus aleutensis*, × 1. (Evans 550, Alaska.)

4. Bromus breviaristátus Buckl. (Fig. 9.) Erect tufted perennial; culms 25 to 50 cm tall; sheaths canescent to densely retrorse-pilose; blades narrow, becoming involute, canescent and also pilose with spreading hairs, mostly erect or ascending, often only 1 to 2 mm wide; panicle narrow, erect, 5 to 15 cm long, the branches short, appressed, often bearing only one spikelet; spikelets 2 to 3 cm long; lemmas appressed-puberulent; awn 3 to 10 mm long. ♃ (*B. subvelutinus* Shear.)—Dry wooded hills and meadows, Wyoming to eastern Washington, California, and Arizona (fig. 10).

FIGURE 9.—*Bromus breviaristatus*. Plant, ×½; spikelet, ×5. (Nuttall, Rocky Mts.)

FIGURE 10.—Distribution of *Bromus breviaristatus*.

5. Bromus carinátus Hook. and Arn. CALIFORNIA BROME. (Fig. 11.) Erect annual or biennial; culms 50 to 100 cm tall; sheaths retrorsely pilose to nearly glabrous; blades flat, sparsely pilose or nearly glabrous, mostly 3 to 8 mm wide; panicle as much as 20 cm long with spreading, often deflexed, branches, in small plants reduced

to a raceme; spikelets (excluding awns) 2 to 3 cm long, mostly 5- to 10-flowered, the florets in anthesis little or not at all overlapping, exposing the rather long rachilla joints; glumes acuminate, 10 to 15 mm long; lemmas more or less appressed-pubescent, rarely glabrous, about 2 mm wide as folded, 10 to 20 mm long; awn 7 to 15 mm long; palea gradually acuminate, nearly as long as the lemma, the teeth short-awned. 2l —Open ground, open woods, and waste places, at low and middle altitudes, common on the Pacific coast, extending into

FIGURE 11.—*Bromus carinatus*, × 1. (Hitchcock 2704, Calif.)

British Columbia, Idaho, through Montana to New Mexico and northern Mexico; introduced in Indiana (fig. 12).

Closely allied to *Bromus carinatus* are the following forms which may be considered members of a variable and polymorphous species. These forms are by some given the rank of species, but they are connected by numerous intergrades which can be distinguished only arbitrarily.

BROMUS MARGINÁTUS Nees. Mostly perennial; spikelets on the average broader than in *B. carinatus*, the awn usually less than 7 mm long; panicles large and open with spreading or drooping but not deflexed branches, or reduced to racemes with a few appressed spikelets; glumes often pubescent; lemmas usually pubescent. 2l —Open woods, open ground, and waste places, common on the Pacific coast, extending north to British Columbia, east to South Dakota, Colorado, and western Texas, and south into northern Mexico; introduced in Alaska, Iowa, Illinois, Maine, and sparingly at other points.

FIGURE 12.—Distribution of *Bromus carinatus*.

BROMUS MARÍTIMUS (Piper) Hitchc. Perennial; culms robust, mostly less than 60 cm tall, more or less geniculate at base with numerous leafy basal shoots; sheaths smooth or minutely scaberulous; blades 12 to 30 cm long, mostly 6 to 8 mm wide, scabrous; panicle mostly 10 to 20 cm long, strict, the branches short, erect; spikelets 3 to 4 cm long. 2l (*B. marginatus maritimus* Piper.)—Near the coast from Sonoma County to Monterey County, Calif.

BROMUS POLYÁNTHUS Scribn. Stout perennial as much as 100 cm tall, with smooth sheaths, scabrous blades, erect or somewhat spread-

ing panicles, and smooth or somewhat scabrous lemmas; awns 4 to 6 mm long. ♃ —Montana to eastern Washington, south to Colorado, Arizona, and (rarely) California. A larger laxer form with more spreading panicles, the upper part somewhat nodding, has been called *B. polyanthus paniculatus* Shear; mountains of Colorado, whence originally described, to Utah, south to New Mexico and Arizona.

Bromus laciniátus Beal. Tall slender perennial; blades flat; panicles 20 to 30 cm long, open, drooping; spikelets flattened, about 3 cm long, mostly purplish; lemmas keeled, awned. ♃ (*B. pendulinus* Sessé.)—Occasionally cultivated for ornament; Mexico.

Section 2. Bromópsis Dum.

Perennials; panicles mostly open; spikelets rather elongate, subterete or slightly compressed before flowering; florets closely overlapping.

6. Bromus inérmis Leyss. Smooth brome. (Fig. 13.) Culms erect, 50 to 100 cm tall, from creeping rhizomes; ligule 1.5 to 2 mm long; blades smooth or nearly so, 5 to 10 mm wide; panicle 10 to 20 cm long, erect, the branches whorled, spreading in flower, contracted at maturity; spikelets 2 to 2.5 cm long, subterete before flowering; first glume 4 to 5 mm long, the second 6 to 8 mm long; lemmas 9 to 12 mm long, glabrous or somewhat scabrous, rarely villous, obtuse, emarginate, mucronate, or with an awn 1 to 2 mm long. ♃ —Cultivated as hay and pasture grass, especially from Minnesota and Kansas to eastern Oregon and Washington, occasionally eastward to Michigan and Ohio, now running wild in these regions; introduced along roads and in waste places in the northern half of the United States. Also used for reseeding western mountain ranges.

Figure 13.—*Bromus inermis*. Plant, × ½; spikelet, × 2½. (Deam 11633, Ind.)

7. Bromus pumpelliánus Scribn. (Fig. 14.) Resembling *B. inermis;* culms 50 to 120 cm tall, from creeping rhizomes; sheaths glabrous or pubescent; blades rather short, mostly glabrous beneath, scabrous or somewhat pubescent on upper surface; panicle 10 to 20 cm long, rather narrow, erect, the branches short, erect, or ascending; spikelets 7- to 11-flowered, 2 to 3 cm long; first glume 1-nerved, the second 3-nerved; lemmas 10 to 12 mm long, 5- to 7-nerved, pubescent along the margin and across the back at base, slightly emarginate; awn mostly 2 to 3 mm long. ♃ —Meadows and grassy slopes, Colorado to the Black

Hills of South Dakota, Idaho, and Alaska; introduced in Michigan (fig. 15). BROMUS PUMPELLIANUS var. TWEÉDYI Scribn. Differing in having lemmas more densely pubescent. 2l —Alberta to Colorado.

8. Bromus eréctus Huds. Culms tufted, erect, 60 to 90 cm tall, slender; sheaths sparsely pilose or glabrous; ligule 1.5 mm long; blades narrow, sparsely pubescent; panicle 10 to 20 cm long, narrow, erect, the branches ascending or erect; spikelets 5- to 10-flowered; glumes acuminate, the first 6 to 8 mm, the second 8 to 10 mm long; lemmas 10 to 12 mm long, glabrous or evenly scabrous-pubescent over the back; awn 5 to 6 mm long. 2l —Established in a few localities from Maine to New York; also in Washington and Alabama; introduced from Europe.

9. Bromus suksdórfii Vasey. (Fig. 16.) Culms 60 to 100 cm tall; panicle 7 to 12 cm long, the branches erect or ascending; spikelets about 2.5 cm long, longer than the pedicels; first glume mostly 1-nerved, 8 to 10 mm long, the second 3-nerved, 8 to 12 mm long; lemmas 12 to 14 mm long, appressed-pubescent near the margin and on the lower part of midnerve; awn 2 to 4 mm long. 2l —Rocky woods and slopes, Washington to the southern Sierra Nevada of California.

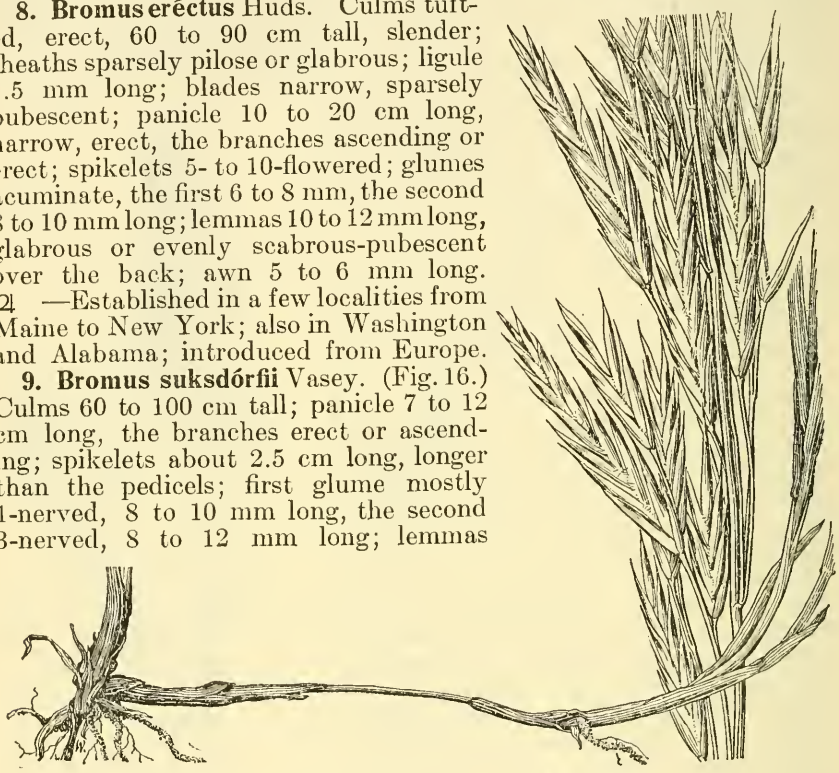

FIGURE 14.—*Bromus pumpellianus*, ×1. (Umbach 453, Mont.)

10. Bromus orcuttiánus Vasey. (Fig. 17.) Culms 80 to 120 cm tall, erect, leafy below, nearly naked above, pubescent at and below the nodes; sheaths pilose or more or less velvety or sometimes glabrous; blades rather short and erect; panicle 10 to 15 cm long, narrow-pyramidal, the few rather rigid short branches finally divaricate; spikelets about 2 cm long, not much flattened, on short pedicels; glumes narrow, smooth, or scabrous, the first 6 to 8 mm long, acute, 1-nerved, or sometimes with faint lateral nerves, the second 8 to 10 mm long, broader, obtuse, 3-nerved; lemmas 10 to 12 mm long, narrow, inrolled at margin, obscurely nerved, scabrous or scabrous-

FIGURE 15.—Distribution of *Bromus pumpellianus*.

pubescent over the back; awn 5 to 7 mm long. ♃ —Open woods, Washington to California; Arizona (Huachuca Mountains).

Bromus orcuttianus var. hállii Hitchc. Blades soft-pubescent on both surfaces; glumes and lemmas pubescent. ♃ —Dry, mostly wooded ridges and slopes, 1,500 to 3,000 m elevation, California.

FIGURE 16.—*Bromus suksdorfii* × 1. (Type.)

FIGURE 17.—*Bromus orcuttianus*, × 1. (Type.)

11. Bromus grándis (Shear) Hitchc. (Fig. 18.) Culms 1 to 1.5 m tall; sheaths softly retrorsely pubescent; blades elongate, rather lax, spreading, densely short-pubescent on both surfaces; panicle 15 to 20 cm long, broad, open, the branches slender, drooping, naked below, the lower usually in pairs, as much as 15 cm long; spikelets 2 to 2.5 cm long, on subflexuous pedicels; first glume usually

distinctly 3-nerved, the second 3-nerved; lemmas 12 to 15 mm long, densely pubescent all over the back; awn 5 to 7 mm long. 2ł —Dry hills at moderate altitudes, Monterey and Madera Counties, Calif., south to San Diego.

FIGURE 18.—*Bromus grandis*, × 1. (Johnston 1407, Calif.)

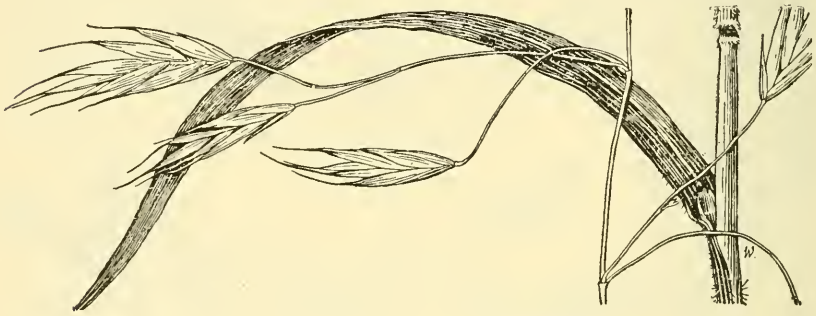

FIGURE 19.—*Bromus pacificus*, × 1. (Elmer 1957, Wash.)

FIGURE 20.—*Bromus laevipes*, × 1. (Amer. Gr. Natl. Herb. 866, Calif.)

12. Bromus pacíficus Shear. (Fig. 19.) Culms 1 to 1.5 m tall, stout, erect, pubescent at the nodes; sheaths sparsely pilose; ligule 3 to 4 mm long; blades sparsely pilose on upper surface, scabrous or smooth beneath, 8 to 10 mm wide; panicle very open, 10 to 20 cm

long, the branches slender, drooping; spikelets 2 to 2.5 cm long, coarsely pubescent throughout; lemmas 11 to 12 mm long, the pubescence somewhat dense on the margin; awn 4 to 6 mm long. 2l —Moist thickets near the coast, southern Alaska to Western Oregon.

13. Bromus laévipes Shear. (Fig. 20.) Light green or glaucous; culms 50 to 100 cm tall, from a decumbent base, often rooting at the lower nodes; ligule 2 to 3 mm long; blades 4 to 7 mm wide; panicles broad, 15 to 20 cm long, the branches slender, drooping; first glume 3-nerved, 6 to 8 mm long, the second 5-nerved, 10 to 12 mm long; lemmas obtuse, 7-nerved, 12 to 14 mm long, densely pubescent on the margin nearly to the apex and on the back at base; awn 3 to 5 mm long. 2l — Moist woods and shady banks, southern Washington to California, Nevada (Charleston Mountains), and Arizona (Tanner Canyon).

FIGURE 21.—*Bromus vulgaris*, × 1. (Chase 4945, Wash.)

14. Bromus vulgáris (Hook.) Shear. (Fig. 21.) Culms slender, 80 to 120 cm tall, the nodes pubescent; sheaths pilose; ligule 3 to 5 mm long; blades more or less pilose; panicle 10 to 15 cm long, the branches slender, drooping; spikelets narrow, about 2.5 cm long; glumes narrow; sparsely pubescent, the first acute, 1-nerved, 5 to 8 mm long, the second broader, longer, obtuse to acutish, 3-nerved; lemmas 8 to 10 mm long, sparsely pubescent over the back, more densely near the margin, or nearly glabrous; awn 6 to 8 mm long. 2l —Rocky woods and shady ravines, western Montana and Wyoming to British Columbia and California (fig. 22). Two scarcely distinct robust varieties have been described: *B. vulgaris* var. *eximius* Shear, a form with glabrous sheaths and nearly glabrous lemmas, Washington to Mendocino County, Calif.; and *B. vulgaris* var. *robustus* Shear, with pilose sheaths and large panicle, British Columbia to Oregon.

FIGURE 22.—Distribution of *Bromus vulgaris*.

15. Bromus ciliátus L. FRINGED BROME. (Fig. 23, *A*.) Culms slender, 70 to 120 cm tall, glabrous or pubescent at the nodes; sheaths glabrous or the lower short-pilose, mostly shorter than the internodes; blades rather lax, as much as 1 cm wide, sparsely pilose on both surfaces to glabrous; panicle 15 to 25 cm long, open, the branches slender, drooping, as much as 15 cm long; first glume 1-nerved, the second 3-nerved; lemmas 10 to 12 mm long, pubescent near the margin on the lower half to three-fourths, glabrous or nearly so on the back; awn 3 to 5 mm long. 2l —Moist woods and rocky slopes, Newfoundland to Washington, south to New Jersey, Tennessee, Iowa, western Texas, and southern California (San Bernardino

FIGURE 23.—*A*, *Bromus ciliatus*. Plant × ½; spikelet and floret × 5. (Hitchcock, Vt.) *B*, *B. purgans*. Floret, × 5. (Deam 27982, Ind.) *C*, *B. latiglumis*. Base of blades, × 1.

Mountains) (fig. 24). *B. richardsoni* Link is a form that has been distinguished by its larger spikelets and lemmas and more robust habit, but it grades freely into *B. ciliatus* and can scarcely be ranked even as a variety. This is the common form in the Rocky Mountains.

BROMUS CILIATUS var. LAEVIGLÚMIS Scribn. Culms stout, leafy, mostly more than 1 m tall; sheaths shorter or longer than the internodes, glabrous to pubescent, not strongly pilose; blades elongate,

FIGURE 24.—Distribution of *Bromus ciliatus.*

FIGURE 25.—Distribution of *Bromus purgans.*

FIGURE 26.—Distribution of *Bromus latiglumis.*

as much as 1 cm wide or even wider; panicle large, open; lemmas glabrous or nearly so.—Woods and river banks, rare. Known from Maine, Vermont, New York, Ontario, Michigan, North Dakota, Maryland, West Virginia, Virginia, North Carolina, and Kansas.

16. Bromus púrgans L. CANADA BROME. (Fig. 23, *B.*) Resembling *B. ciliatus;* nodes mostly 4 to 6; sheaths, except the lower 1 or 2, shorter than the internodes, more or less retrorsely pilose, or sometimes all glabrous; blades narrowed at base, and without flanges or auricles; pubescence of lemma nearly uniform, sometimes more dense on the margins, sometimes sparse and short on the back or scabrous only. 2 —Moist woods and rocky slopes, Massachusetts to Alberta, south to northern Florida and Arizona (fig. 25).

FIGURE 27.—*Bromus texensis,* × 1. (Tracy 8881, Tex.)

17. Bromus latiglúmis (Shear) Hitchc. (Fig. 23, *C.*) Differing from *B. purgans* in having usually 10 to 20 nodes; sheaths overlapping, longer than the internodes, more or less pilose, especially about the throat and collar; base of blades with prominent flanges on each side, these usually prolonged into auricles. Where the ranges of *B. purgans* and *B. latiglumis* overlap, the latter flowers several weeks later than the other. 2 —Alluvial banks of streams, Maine to eastern Montana, south to North Carolina and Oklahoma (fig. 26). A form with densely canescent sheaths has been called *B. incanus* (Shear) Hitchc.—Vermont to North Dakota, south to Pennsylvania, Delaware, Maryland, Ohio, and Iowa; western Texas, Colorado, and New Mexico.

18. Bromus texénsis (Shear) Hitchc. (Fig. 27.) Culms slender, mostly solitary, 40 to 70 cm tall; sheaths much shorter than the

internodes, softly retrorsely pilose; blades pubescent on both surfaces, mostly 3 to 6 mm wide; panicle mostly not more than 10 cm long, few-flowered, drooping; lemmas scabrous to nearly smooth;

FIGURE 28.—*Bromus anomalus*, × 1. (Pammel, Colo.)

awn 5 to 7 mm long. 2↓ —Among brush, Texas (Bexar County and Corpus Christi) apparently rare; northern Mexico.

19. Bromus anómalus Rupr. NODDING BROME. (Fig. 28.) Culms slender, 30 to 60 cm tall, the nodes pubescent; sheaths sparsely pilose to glabrous; ligule about 1 mm long; blades scabrous, mostly 2 to 4 mm wide; panicle about 10 cm long, often less, few-flowered, drooping; first glume 3-nerved, the second 5-nerved, lemmas about 12 mm long, evenly and densely pubescent over the back; awn 2 to 4 mm long. 2↓ (*B. porteri* Nash.)—Open woods, Saskatchewan and Idaho, to western Texas, southern California, and Mexico (fig. 29).

FIGURE 29.—Distribution of *Bromus anomalus*.

BROMUS ANOMALUS var. LANÁTIPES (Shear) Hitchc. More robust, with woolly sheaths and usually broader blades. 2↓ (*B. porteri lanatipes* Shear.)—Colorado to western Texas and Arizona.

20. Bromus kálmii A. Gray. (Fig. 30.) Culms slender, 50 to 100 cm tall, usually pubescent at and a little below the nodes; sheaths usually shorter than the internodes, pilose or the upper glabrous;

blades usually sparsely pilose on both sides, 5 to 10 mm wide; panicle

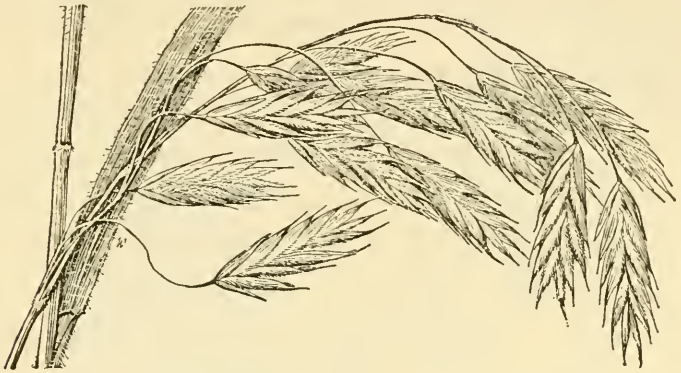

FIGURE 30.—*Bromus kalmii*, × 1. (Chase 1866½, Ind.)

rather few-flowered, drooping, mostly 5 to 10 cm long, the branches slender, flexuous, bearing usually 1 to 3 spikelets; first glume 3-nerved, the second 5-nerved; lemmas 7 to 10 mm long, pubescent over the back, more densely so near the margins; awn 2 to 3 mm long. ♃ —Dry or sandy ground and open woods, Maine to Minnesota and South Dakota, south to western Maryland and Iowa (fig. 31). Called wild chess.

FIGURE 31.—Distribution of *Bromus kalmii*

21. Bromus frondósus (Shear) Woot. and Standl. (Fig. 32.)

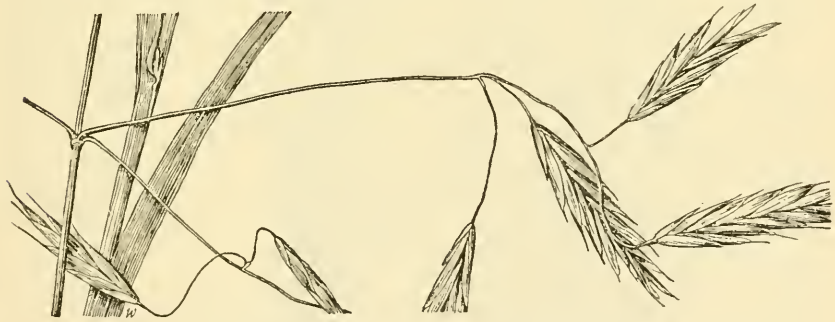

FIGURE 32.—*Bromus frondosus*, × 1. (Hitchcock 13282, N.Mex.)

Culms erect to weakly reclining, 80 to 100 cm tall; sheaths glabrous or the lower pilose; blades pale green, scabrous, mostly less than 5 mm wide, occasionally to 10 mm, rarely wider; panicle open, drooping, the slender lower branches naked below; first glume 2- to 3-nerved; lemmas pubescent all over, rarely nearly glabrous. ♃ (*B. porteri frondosus* Shear.)—Open woods and rocky slopes. Colorado, Utah, New Mexico, and Arizona (fig. 33).

FIGURE 33.—Distribution of *Bromus frondosus*.

SECTION 3. BRÓMIUM Dum.

Annuals; spikelets subcompressed; glumes and lemmas comparatively broad, elliptic or oblong-elliptic. Introduced, mostly from Europe.

22. Bromus brizaefórmis Fisch. and Mey. RATTLESNAKE CHESS. (Fig. 34.) Culms 30 to 60 cm tall; sheaths and blades pilose-pubescent; panicle 5 to 15 cm long, lax, secund, drooping; spikelets rather few, oblong-ovate, 1.5 to 2.5 cm long, about 1 cm wide; glumes broad, obtuse, the first 3- to 5-nerved, the second 5- to 9-nerved, about twice as long as the first; lemmas 10 mm long, very broad, inflated, obtuse, smooth, with a broad scarious margin, nearly or quite awnless. ⊙ —Sandy fields and waste ground, occasional from Washington and Idaho to California, rare eastward to Massachusetts and Delaware (fig. 35); introduced from Europe. Sometimes cultivated for ornament.

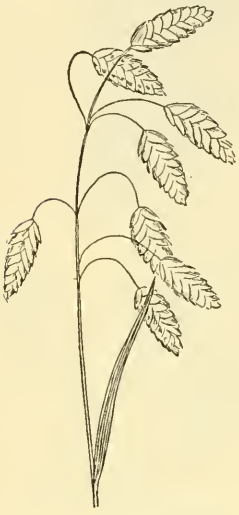

FIGURE 34.—*Bromus brizaeformis*, × ½. (Leckenby 40, Wash.)

23. Bromus secalínus L. CHESS. (Fig. 36.) Culms erect, 30 to 60 cm tall; sheaths glabrous or the lower sometimes puberulent; panicle pyramidal, nodding, 7 to 12 cm long, the lower branches 3 to 5, unequal, drooping; spikelets ovoid-lanceolate, becoming somewhat turgid at maturity, 1 to 2 cm long, 6 to 8 mm wide; glumes obtuse, the first 3- to 5-nerved, 4 to 6 mm long, the second 7-nerved, 6 to 7 mm long; lemmas 7-nerved, 6 to 8 mm long, elliptic, obtuse, smooth or scaberulous, the margin strongly involute at maturity, shortly bidentate at apex, the undulate awns usually 3 to 5 mm long, sometimes very short or obsolete; palea about as long as lemma. ⊙ —Introduced from Europe, a weed in grainfields and waste places, more or less throughout the United States. Also called cheat. Occasionally utilized for hay in Washington and Oregon. In fruit the turgid florets are somewhat distant so that, viewing the spikelet sidewise, the light passes through the small openings at base of each floret. BROMUS SECALINUS var. VELÚTINUS (Schrad.) Koch. Spikelets pubescent. ⊙ —Oregon (Corvallis, Dalles). Europe.

FIGURE 35.—Distribution of *Bromus brizaeformis*

The species of the group containing *Bromus secalinus, B. commutatus, B. mollis,* and *B. racemosus* are closely allied, differentiated only by arbitrary characters. The forms are recognized as species in most recent European floras and this disposition is here followed.

FIGURE 36.—*Bromus secalinus*. Plant, × ½; spikelet and floret, × 5 (Chase, Ill.)

24. Bromus commutátus Schrad. HAIRY CHESS. (Fig. 37.) Resembling *B. secalinus*, but the sheaths retrorsely pilose; lemmas at maturity less plump and more overlapping; awn commonly somewhat longer. ⊙ —Introduced from Europe, a weed in fields and waste places, Washington to California and Montana and eastward through the Northern States, thence less commonly southward. BROMUS COMMUTATUS var. APRICÓRUM Simonkai. Lemmas pubescent. ⊙ —Washington to California; rare. Introduced from Europe.

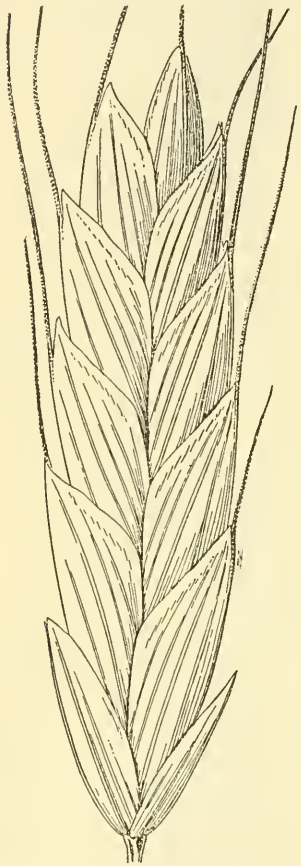

FIGURE 37.—*Bromus commutatus*, × 5. (Amer. Gr. Nat. Herb. 890, Va.)

25. Bromus móllis L. SOFT CHESS. (Fig. 38.) Softly pubescent throughout; culms erect, 20 to 80 cm tall; panicle erect, contracted, 5 to 10 cm long, or, in depauperate plants, reduced to a few spikelets; glumes broad, obtuse, coarsely pilose or scabrous-pubescent, the first 3- to 5-nerved, 4 to 6 mm long, the second 5- to 7-nerved, 7 to 8 mm long; lemmas broad, soft, obtuse, 7-nerved, coarsely pilose or scabrous-pubescent, rather deeply bidentate, 8 to 9 mm long, the margin and apex hyaline; awn rather stout, 6 to 9 mm long; palea about three-fourths as long as lemma. ⊙ —Weed in waste places and cultivated soil, introduced from Europe, abundant on the Pacific coast, occasional eastward to Nova Scotia and south to North Carolina (fig. 39). This has been referred to *B. hordeaceus* L., a distinct European species.

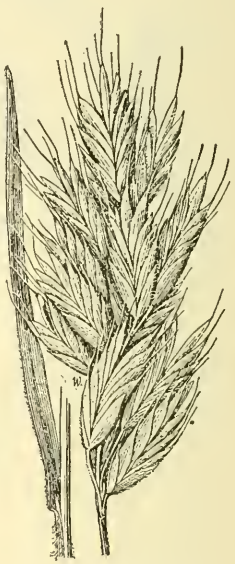

FIGURE 38.—*Bromus mollis*, × 1. (Hall 258, Calif.)

FIGURE 39.—Distribution of *Bromus mollis*.

26. Bromus mollifórmis Lloyd. (Fig. 40.) Culms erect, mostly 10 to 20 cm tall, sometimes taller; lower sheaths felty-pubescent, the upper glabrous; blades narrow, the upper surface with scattered rather stiff hairs; panicle 2 to 4 cm long, ovoid, dense, few-flowered; spikelets oblong, compressed, 12 to 18 mm long; glumes about 6 mm long, the second broader, loosely pilose, the hairs spreading; lemmas thinner and narrower than in *B. mollis*, closely imbricate, about 8 mm long,

pilose with appressed hairs, the margin whitish; awn from below the entire apex, 5 to 7 mm long; palea a little shorter than the lemma; anthers 0.4 mm long, about as broad. ⊙ —Open ground, southern California; introduced from Europe.

27. Bromus racemósus L. (Fig. 41.) Differing from *B. mollis* in the somewhat more open panicle and glabrous or scabrous lemmas. ⊙ (Including what in this country has been called *B. hordeaceus glabrescens* Shear, *B. hordeaceus* var. *leptostachys* Beck, and *B. mollis* f. *leiostachys* Fernald.)—Weed in waste places, chiefly on the Pacific coast and east to Idaho, Colorado, and Arizona; a few points from Illinois to Maine and North Carolina (fig. 42); introduced from Europe.

FIGURE 40.—*Bromus molliformis*, × 1. (Chase 5564, Calif.)

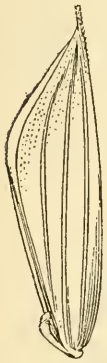

FIGURE 41.—*Bromus racemosus* × 5. (Hitchcock 2667, Calif.)

Bromus scopárius L. Resembling *B. molliformis;* culms 20 to 30 cm tall; sheaths soft-pubescent; blades glabrous, scabrous or sparingly pilose; panicle contracted, erect, 3 to 7 cm long; spikelets about 1.5 cm long, 3 to 4 mm wide; lemmas about 7 mm long, narrow, glabrous; awn 5 to 8 mm long, finally divaricate. ⊙ —Introduced from Europe in California (Mariposa) and Virginia (Newport News, on ballast).

Bromus macróstachys L. Annual; culms erect, 30 to 60 cm tall; panicle narrow, compact, consisting of a few large spikelets about 3 cm long. ⊙ —Wool waste, Yonkers, N.Y. Sometimes cultivated for ornament. Mediterranean region.

FIGURE 42.—Distribution of *Bromus racemosus.*

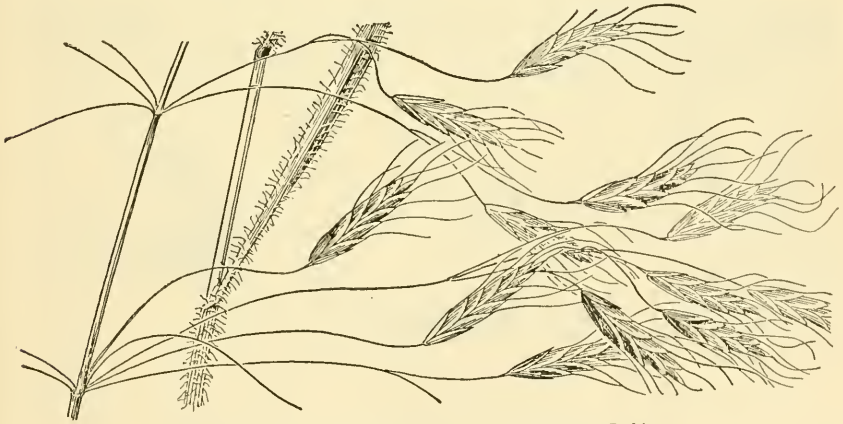

FIGURE 43.—*Bromus japonicus*, × 1. (Deam 6833, Ind.)

28. Bromus japónicus Thunb. JAPANESE CHESS. (Fig. 43.) Culms erect or geniculate at base, 40 to 70 cm tall; sheaths and

blades pilose; panicle 12 to 20 cm long, broadly pyramidal, diffuse, somewhat drooping, the slender lower branches 3 to 5, all the branches flexuous; glumes rather broad, the first acute, 3-nerved, 4 to 6 mm long, the second obtuse, 5-nerved, 6 to 8 mm long; lemmas broad, obtuse, smooth, 7 to 9 mm long, 9-nerved, the marginal pair of nerves faint, the hyaline margin obtusely angled above the middle, the apex emarginate; awn 8 to 10 mm long, somewhat twisted and strongly flexuous at maturity, those of the lower florets shorter than the upper; palea 1.5 to 2 mm shorter than the lemma. ⊙ (*B. patulus* Mert. and Koch)—Weed in waste places, Vermont to Washington, south to North Carolina and California (fig. 44); widely distributed in the Old World.

FIGURE 44.—Distribution of *Bromus japonicus*.

29. Bromus arvénsis L. (Fig. 45.) Resembling *B. japonicus*, foliage downy to subglabrous; spikelets thinner, flatter (less turgid),

FIGURE 45.—*Bromus arvensis*, × 1. (Gray, Md.)

often tinged with purple; awn straight or nearly so in drying; palea as long as the lemma or only slightly shorter. ⊙ —Open ground, cultivated soil, rare, eastern Maryland; introduced from Europe.

30. Bromus arenárius Labill. AUSTRALIAN CHESS. (Fig. 46.)

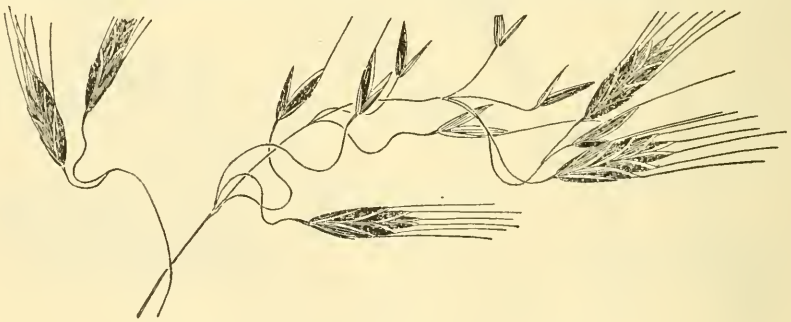

FIGURE 46.—*Bromus arenarius*, × 1. (Pendleton 1459, Calif.)

Culms slender, 15 to 40 cm tall, sheaths and blades pilose; panicle open, pyramidal, nodding, 8 to 11 (rarely 15) cm long, the spreading branches and pedicels sinuously curved; glumes densely pilose, acute, scarious-margined the first narrower, 3-nerved, 8 mm long, the

second 7-nerved, 10 mm long; lemmas densely pilose, 7-nerved, 10 mm long; awn straight, 10 to 16 mm long. ⊙ —Sandy roadsides, gravelly or sterile hills, Oregon, California, and Nevada; introduced from Australia.

SECTION 4. EUBRÓMUS Godr.

Tufted annuals; spikelets compressed; glumes and lemmas narrow, long-awned; first glume 1-nerved, the second 3-nerved; lemma 5- to 7-nerved, cleft at the apex, the hyaline teeth 2 to 5 mm long; floret at maturity with a sharp hard point or callus. Introduced from Europe.

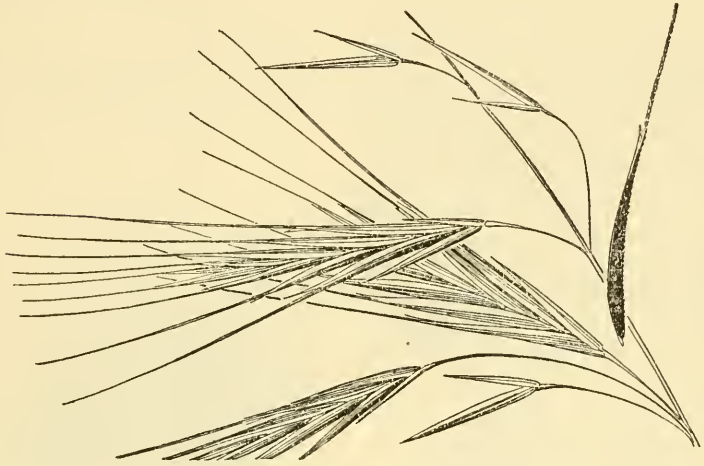

FIGURE 47.—*Bromus rigidus*, × 1. (Tracy 4702, Calif.)

31. Bromus rígidus Roth. RIPGUT GRASS. (Fig. 47.) Culms 40 to 70 cm tall; sheaths and blades pilose; panicle open, nodding, rather few-flowered, 7 to 15 cm long, the lower branches 1 to 2 cm long; spikelets usually 5- to 7-flowered, 3 to 4 cm long; glumes smooth, the first 1.5 to 2 cm long, the second 2.5 to 3 cm long; lemmas 2.5 to 3 cm long, scabrous or puberulent, the teeth 3 to 4 mm long; awn stout, 3.5 to 5 cm long. ⊙ (*B. villosus* Forsk. not Scop.; *B. maximus* Desf. not Gilib.)—Common weed in open ground and waste places in the southern half of California, forming dense stands over great areas in the lowlands, occasional north to British Columbia and east to Idaho, Nevada, and Arizona; rare in the Eastern States, Maryland, Virginia, Texas (fig. 48). Distinguished from the other species of the section by the long awns. BROMUS RIGIDUS var. GUSSÓNEI (Parl.) Coss. and Dur. Differing in having more open panicles, the stiffer, more spreading lower branches as much as 10 to 12 cm long. ⊙ —Weed like *B. rigidus*, growing in similar places, Washington to California, and Arizona; more common than the species in middle and northern California.

FIGURE 48.—Distribution of *Bromus rigidus*.

32. Bromus stérilis L. (Fig. 49.) Resembling *B. rigidus*, less robust; culms 50 to 100 cm tall; sheaths pubescent; panicle 10 to 20

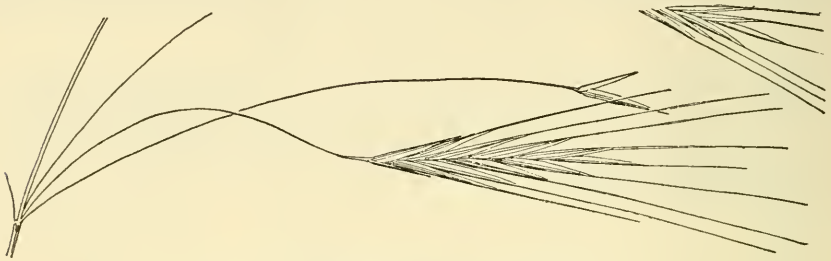

FIGURE 49.—*Bromus sterilis*, × 1. (Boettcher 2423, D.C.)

cm long, the branches drooping; spikelets 2.5 to 3.5 cm long, 6- to 10-flowered; glumes lanceolate-subulate, the first about 8 mm long; lemmas 17 to 20 mm long, scabrous or scabrous-pubescent, the teeth 2 mm long; awn 2 to 3 cm long. ⊙ —Fields and waste places, introduced in a few localities from British Columbia to California and Colorado, and the Eastern States from New England and Illinois to Virginia and Alabama (fig. 50).

FIGURE 50.—Distribution of *Bromus sterilis*.

33. Bromus rúbens L. FOXTAIL CHESS. (Fig. 51.) Culms 15 to 40 cm tall, puberulent below the panicle; sheaths and blades pubescent; panicle erect, compact, ovoid, usually 4 to 8 cm long, usually purplish; spikelets 4- to 11-flowered, about 2.5 cm long; first glume 7 to 9 mm long, the second 10 to 12 mm long; lemmas, scabrous, 12 to 16 mm long, the teeth 4 to 5 mm long; awn 18 to 22 mm long, somewhat spreading at maturity. ⊙ —Dry hills and in waste or cultivated ground, Washington to southern California, very abundant over extensive areas, and east to Utah and Arizona; Massachusetts (fig. 52).

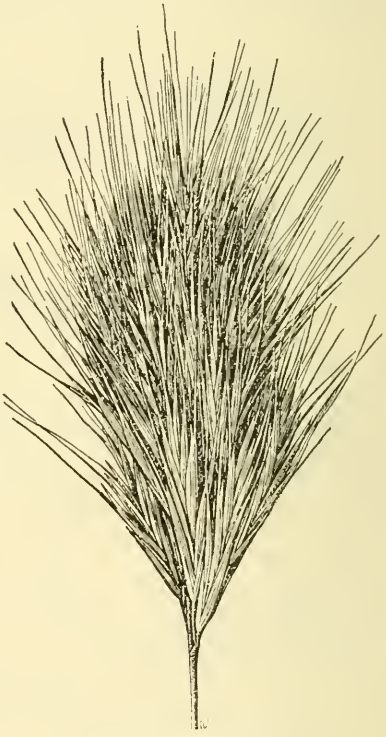

FIGURE 51.—*Bromus rubens*, × 1. (Blankenship 36, Calif.)

34. Bromus madritensis L. (Fig. 53.) Resembling *B. rubens* but the culms smooth below the less dense panicles; sheaths mostly smooth; blades puberulent or glabrous; panicle 5 to 10 cm long, oblong-ovoid (in dried specimens more or less fan-shaped); lemmas a little longer than in *B. rubens*, the teeth 2 to 3 mm long; awn rather stout, 16 to 22 mm long. ⊙ —Open ground and waste places, Oregon and California; less common than *B. rubens*. Occasionally cultivated for ornament.

FIGURE 52.—Distribution of *Bromus rubens*.

35. Bromus tectórum L. DOWNY CHESS. (Fig. 54.) Culms erect or spreading, slender, 30 to 60 cm tall; sheaths and blades pubescent; panicle 5 to 15 cm long, rather dense, soft, drooping, often purple; spikelets nodding, 12 to 20 mm long; glumes villous, the first 4 to 6 mm long, the second 8 to 10 mm long; lemmas lanceolate, villous or pilose, 10 to 12 mm long, the teeth 2 to 3 mm long; awn 12 to 14 mm long. ⊙ —Along roadsides, banks, and waste places, common on the Pacific coast, especially in Washington and Oregon, and here and there throughout the United States as far south as Virginia and Mississippi (fig. 55). BROMUS TECTORUM var. GLABRÁTUS Spenner. Differing in having glabrous spikelets. ⊙ (*B. tectorum* var. *nudus* Klett and Richt.)—About the same range as the species, less common.

FIGURE 53.—*Bromus madritensis*, × 1. (Eastwood, Calif.)

SECTION 5.—NEOBRÓMUS Shear, as subgenus

Annual; lemmas lanceolate, deeply bifid, the teeth aristate; awn twisted, geniculate. Approaches *Trisetum*.

36. Bromus trínii Desv. CHILIAN CHESS. (Fig. 56.) Culms 30 to 60 cm or even 100 cm tall, erect or branched and spreading below, often pubescent at the nodes; sheaths and blades pilose-pubescent to nearly smooth; panicle 8 to 20 cm long, narrow, rather dense, erect, the branches erect or the lower more or less

FIGURE 54.—*Bromus tectorum.* Plant, × ½; spikelet and floret, × 5. (Chase 2051, Ind.)

spreading or flexuous; spikelets narrow, 1.5 to 2 cm long, 5- to 7-flowered; glumes lanceolate, acuminate, the first mostly 1-nerved, 8 to 10 mm long, the second mostly 3-nerved, 12 to 16 mm long; lemmas 5-nerved, 12 to 14 mm long, pubescent, acuminate, with narrow teeth 2 to 3 mm long, the teeth aristate; awn 1.5 to 2 cm long, twisted below, bent below the middle and strongly divaricate when old. ⊙ (Including *B. trinii* var. *pallidiflorus* Desv.)—Dry plains and rocky or wooded slopes, Oregon, California, and Baja California, rarely eastward to Colorado; introduced from Chile (fig. 57).

FIGURE 55.—Distribution of *Bromus tectorum*.

BROMUS TRINII var. EXCÉLSUS Shear. Differing in having larger spikelets, 7-nerved lemmas, and divaricate but not twisted or bent awns; teeth of the lemma acuminate, but not aristate. ⊙ —A little-known form from the Panamint Mountains, Calif.

FIGURE 56.—*Bromus trinii*, × 1. (Eastwood, Calif.)

The genus *Brachypódium* Beauv. is represented in the United States by one species found only on ballast, and another occasionally cultivated. The genus is placed in Festuceae though it resembles *Agropyron*, differing from it in having short-pediceled spikelets. Lemmas rounded on the back. BRACHYPODIUM DISTÁCHYON (L.) Beauv. (*Bromus distachyos* L.) is an annual 10 to 20 cm tall, with short flat blades and an erect stiff raceme of 1 to few appressed almost sessile awned spikelets. ⊙ —On ballast, New Jersey (Camden) and Oregon (Portland). Adventive from Europe. BRACHYPODIUM SYLVÁTICUM (Huds.) Beauv. is a perennial with usually several spikelets in a raceme. ♃ —Occasionally cultivated for ornament. Europe.

3. FESTÚCA L. FESCUE

Spikelets few- to several-flowered (rarely 1-flowered in some of the spikelets of a panicle), the rachilla disarticulating above the glumes and between the florets, the uppermost floret reduced; glumes narrow, acute, unequal, the first sometimes very small; lemmas rounded on the back, membranaceous or somewhat indurate, 5-nerved, the nerves often obscure, acute or rarely obtuse, awned from the tip, or rarely from a minutely bifid apex, sometimes awnless. Low or rather tall annuals or perennials, the spikelets in narrow or open panicles. The blades are sometimes somewhat auriculate as in the Hordeae. Standard species, *Festuca ovina*. Name from *Festuca*, an old Latin name for a weedy grass.

FIGURE 57.—Distribution of *Bromus trinii*.

Many of the perennial species of fescue are important forage grasses in the grazing regions of the West. *Festuca arizonica*, Arizona fescue,

of northern Arizona and *F. idahoensis*, bluebunch fescue, of the region from Colorado to central California and northward, are important, though they become rather tough with age. *F. viridula*, greenleaf fescue, locally called mountain bunchgrass, is an outstanding grass in subalpine regions of the Northwestern States, and *F. thurberi*, Thurber fescue, is important in similar regions from Colorado to Montana. *F. ovina*, sheep fescue, is a good grazing grass though not abundant, but its variety *brachyphylla*, alpine fescue, furnishes much of the forage above timber line from the Rocky Mountains westward. *F. occidentalis*, western fescue, in open woods up to 10,000 feet in the Northwest, and *F. rubra*, red fescue, widely distributed at various altitudes in the West, are valuable in proportion to their abundance.

The most important cultivated species is *F. elatior*, meadow fescue, a native of Europe, used for hay and pasture in the humid region, especially in Tennessee, Missouri, and Kansas. *F. ovina*, and its allies, and *F. rubra*, are cultivated to a limited extent in the Eastern States as lawn or pasture grasses, usually in mixtures.

Plants annual ..... SECTION 1. VULPIA.
Plants perennial ..... SECTION 2. EUFESTUCA.

Section 1. Vulpia

1a. Spikelets mostly more than 5-flowered. Lowest lemma 4 to 5 mm long, the margin inrolled, not scarious ..... 1. F. OCTOFLORA.
1b. Spikelets mostly less than 5-flowered (sometimes 6-flowered in *F. dertonensis* and *F. sciurea*). Lemmas usually scarious-margined.
2a. Panicle narrow, the branches appressed.
Lemmas appressed-pubescent over the back, about 3 mm long. 2. F. SCIUREA.
Lemmas glabrous, scabrous or ciliate, not pubescent over the back.
Lemmas ciliate toward the apex ..... 3. F. MEGALURA.
Lemmas not ciliate.
First glume two-thirds to three-fourths as long as the second. 4. F. DERTONENSIS.
First glume much shorter than the second, 1 to 2 mm long. 5. F. MYUROS.
2b. Panicle rather short, the branches and often the spikelets spreading (scarcely spreading in *F. arida*).
3a. Spikelets glabrous.
Pedicels appressed; lower branches of the panicle usually finally reflexed; spikelets usually 3- to 5-flowered ..... 6. F. PACIFICA.
Pedicels or nearly all of them finally reflexed, notably those of the upper part of the main axis; branches of the panicle reflexed; spikelets mostly 1- or 2-flowered ..... 10. F. REFLEXA.
3b. Spikelets pubescent, the pubescence on glumes or lemmas or on both.
4a. Pedicels appressed or slightly spreading; lower branches of panicle usually spreading or reflexed.
Lemmas glabrous; glumes pubescent ..... 7. F. CONFUSA.
Lemmas pubescent.
Lemmas hirsute; glumes glabrous or pubescent; lower branches of panicle spreading or reflexed ..... 8. F. GRAYI.
Lemmas woolly-pubescent; glumes glabrous; panicle nearly simple, the branches scarcely spreading ..... 9. F. ARIDA.
4b. Pedicels and panicle branches all finally spreading or reflexed.
Glumes glabrous; lemmas pubescent ..... 11. F. MICROSTACHYS.
Glumes pubescent; lemmas pubescent ..... 12. F. EASTWOODAE.
Glumes pubescent; lemmas glabrous ..... 13. F. TRACYI.

Section 2. Eufestuca

1a. Blades flat, rather soft and lax (except in *F. kingii*), mostly more than 3 mm wide.
Lemmas awned, the awn usually more than 2 mm long.
Floret long-stipitate, the rachilla appearing to be jointed a short distance below the floret ---------- 14. F. SUBULIFLORA.
Floret not stipitate.
Lemmas indistinctly nerved; awn terminal; blades 3 to 10 mm wide. 15. F. SUBULATA.
Lemmas distinctly 5-nerved; awn from between 2 short teeth; blades 2 to 4 mm wide ---------- 16. F. ELMERI.
Lemmas awnless or with an awn rarely as much as 2 mm long.
Spikelets oblong to linear, mostly 8- to 10-flowered and more than 10 mm long ---------- 17. F. ELATIOR.
Spikelets ovate or oval, mostly not more than 5-flowered, less than 10 mm long.
Panicles narrow, the branches short, appressed; blades firm, erect. 18. F. KINGII.
Panicles open, the branches spreading, naked below; blades lax, spreading.
Lemmas acuminate, sometimes with an awn as much as 2 mm long, membranaceous, distinctly nerved, 6 to 9 mm long. 19. F. SORORIA
Lemmas awnless, obtuse to acutish, rather firm, indistinctly nerved.
Lemmas 5 to 7 mm long, acutish ---------- 20. F. VERSUTA.
Lemmas about 4 mm long, relatively blunt, rather turgid.
Spikelets loosely scattered in a very open panicle with long slender branches ---------- 21. F. OBTUSA.
Spikelets somewhat aggregate toward the ends of rather short branches of a less open nodding panicle ---------- 22. F. SHORTII.

1b. Blades involute or if flat less than 3 mm wide (sometimes flat in *F. californica* but firm and soon involute).
Ligule 2 to 4 mm long or longer. Lemmas awnless or cuspidate.
Lemmas 7 mm long ---------- 23. F. THURBERI.
Lemmas 4 mm long ---------- 24. F. LIGULATA.
Ligule short.
Collar and mouth of sheath villous. Culms tall and stout (rather short in var. *parishii*) ---------- 26. F. CALIFORNICA.
Collar and mouth of sheath not villous.
Panicle branches densely ciliate on the angles. Blades about 1 mm wide, flat or folded ---------- 27. F. DASYCLADA.
Panicle branches not ciliate on the angles.
Culms decumbent at the usually red, fibrillose base, in loose tufts. Awn of lemma shorter than the body; blades smooth ---------- 29. F. RUBRA.
Culms erect.
Lemmas 7 to 10 mm long, scabrous. Culms densely tufted, rather stout, usually scabrous below the panicle; lemmas acute, rarely short-awned ---------- 25. F. SCABRELLA.
Lemmas mostly not more than 7 mm long.
Lemmas awnless (see also *F. arizonica*).
Lemmas 6 to 7 mm long; culms slender, loosely tufted. 28. F. VIRIDULA.
Lemmas about 3 mm long ---------- 32. F. CAPILLATA.
Lemmas awned.
Awn as long as or longer than body of the lemma; blades soft, glabrous, sulcate ---------- 30. F. OCCIDENTALIS.
Awn shorter than body of the lemma; blades slender, numerous, usually scabrous.
Blades mostly not more than half as long as the culms; panicle narrow, often almost spikelike, few-flowered, mostly less than 10 cm long; culms mostly less than 30 cm tall. 31. F. OVINA.
Blades elongate; panicles 10 to 20 cm long, somewhat open; culms 30 to 100 cm tall.
Awn 2 to 4 mm long ---------- 33. F. IDAHOENSIS.
Awn short or obsolete ---------- 34. F. ARIZONICA.

FIGURE 58.—*A*, *Festuca octoflora*. Plant, × ½; spikelet, × 5. (Chase 1776, Ind.) *B*, *F. sciurea*. Panicle × ½; spikelet, × 5. (Reverchon, Tex.)

SECTION 1. VÚLPIA (Gmel.) Reichenb.

Slender annuals; lemmas awned; stamens usually 1, sometimes 3; flowers usually self-pollinated. Some of the species, especially numbers 7 to 13, resemble each other closely. The differences, though small, appear to be constant, hence the recognizable forms are maintained as species, rather than reduced to varieties under leading species.

FIGURE 60.—*Festuca megatura*. Panicle, × 1; spikelet, × 5. (Leiberg 150, Oreg.)

1. Festuca octoflóra Walt. SIX-WEEKS FESCUE. (Fig. 58, *A*.) Culms erect, usually 15 to 30 cm tall, sometimes as much as 50 cm; blades narrow, involute, 2 to 10 cm long; panicle narrow, the branches short, appressed, rarely spreading; spikelets 6 to 8 mm long, densely 5- to 13-flowered; glumes subulate-lanceolate, the first 1-nerved, the second 3-nerved, 4 mm long; lemmas firm, convex, lanceolate, glabrous or scabrous, 4 to 5 mm long, the margins not scarious; awn commonly 2 to 5 mm long. ⊙ (*F. tenella* Willd.)—Open sterile ground, throughout the United States and southern Canada at low altitudes, extending into Baja California. FESTUCA OCTOFLORA var. HIRTÉLLA Piper. Plants low and spreading; foliage sometimes pubescent; lemmas hirtellous or pubescent. ⊙ —Texas to southern California, southward in Baja California and northward to Nevada, Montana, and Washington.

FIGURE 59.—Distribution of *Festuca sciurea*.

FIGURE 61.—Distribution of *Festuca megalura*.

2. Festuca sciúrea Nutt. (Fig. 58, *B*.) Culms erect, 15 to 50 cm tall; blades less than 1 mm wide, often capillary, soft, mostly involute, 1 to 10 cm long; panicle narrow, 5 to 20 cm long; spikelets 4- to 6-flowered, 4 to 5 mm long; first glume 2 mm long, the second 3.5 mm long; lemmas 3 to 3.5 mm long, sparsely appressed-pubescent; awn 6 to 11 mm long. ⊙ —Open ground, Maryland to Florida, west to Oklahoma and Texas (fig. 59).

3. Festuca megalúra Nutt. FOXTAIL FESCUE. (Fig. 60.) Culms 20 to 60 cm tall; sheaths and narrow blades glabrous; panicle narrow,

7 to 20 cm long, the branches appressed; spikelets 4- or 5-flowered; first glume 1.5 to 2 mm long, the second 4 to 5 mm long; lemmas

FIGURE 62.—*A*, *Festuca myuros*, spikelet, × 5. (Chase 2393, D. C.) *B*, *F. dertonensis*. Plant, × ½; spikelet, × 5 (Palmer 2041, Calif.)

linear-lanceolate, scabrous on the back especially toward the apex, ciliate on the upper half; awn 8 to 10 mm long. ⊙ —Open sterile

ground, British Columbia to Baja California, common in the Coast Ranges of California, east to Idaho and Arizona and in a few localities eastward; Pacific slope of South America (fig. 61). In mature lemmas the cilia may be obscured by the inrolling of the edges; moistening the floret will bring the cilia to view.

4. Festuca dertonénsis (All.) Aschers. and Graebn. (Fig. 62, *B*.) Resembling *F. megalura*, the panicles on the average shorter, usually less dense; glumes longer, the first about 4 mm long, the second 6 to 7 mm long; lemma lanceolate, scabrous on the back toward the apex, 7 to 8 mm long; awn 10 to 13 mm long. ⊙ — Dry hills and meadows, British Columbia to southern California; rare as a waif in the Eastern States; introduced from Europe. This species has been referred to *F. bromoides* L. by American authors.

FIGURE 63.—Distribution of *Festuca myuros*.

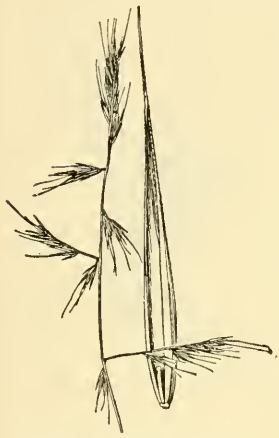

FIGURE 64.—*Festuca pacifica*. Panicle, × ½; floret, × 5. (Type.)

FIGURE 65.—Distribution of *Festuca pacifica*.

5. Festuca myúros L. (Fig. 62, *A*.) Differing from *F. megalura* chiefly in the absence of cilia on the lemma; panicle usually smaller, first glume 1 to 1.5 mm, the second 4 to 4.5 mm, long. ⊙ —Open ground, Coastal Plain, Massachusetts to Texas; Ohio; Pacific coast, Washington to southern California (fig. 63); introduced from Europe.

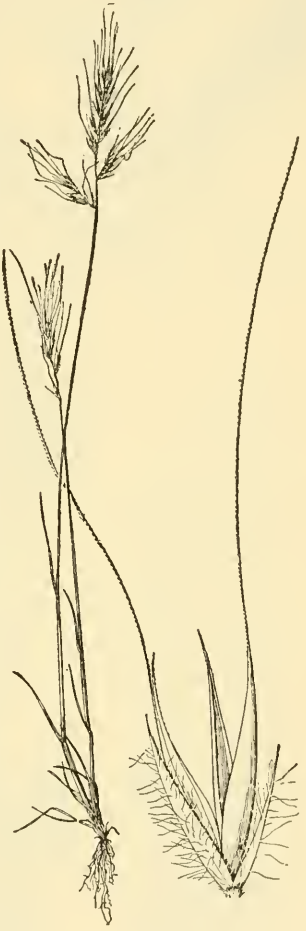

FIGURE 66.—*Festuca confusa*. Plant, × 1; spikelet, × 5. (Type.)

6. Festuca pacífica Piper. (Fig. 64.) Culms erect or geniculate at base, 30 to 60 cm tall; blades soft, loosely involute, glabrous, 3 to 5 cm long; panicle 5 to 12 cm long, the lower branches solitary, somewhat distant, subsecund, spreading, 1 to 3 cm long; spikelets 3- to 6-flowered; first glume subulate-lanceolate, about 4 mm long, the second lanceolate-acuminate, about 5 mm long; lemmas lanceolate, glabrous or scaberulous, 6 to 7 mm long; awn 10 to 15 mm long.

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FIGURE 67.—*A*, *Festuca grayi*. Plant, × ½; spikelet, × 5. (Pringle, Ariz.) *B*, *F. arida*. Plant, × ½; spikelet, × 5. (Type.)

⊙ —Open ground, mountain slopes, and open woods, British Columbia to Baja California, east to western Montana and New Mexico (fig. 65).

7. Festuca confúsa Piper. (Fig. 66.) Resembling *F. pacifica;* sheaths retrorsely pilose; foliage pubescent; spikelets usually 2- or 3-flowered; glumes hirsute with long spreading hairs; lemmas glabrous. ⊙ —Dry hillsides, Washington to southern California.

FIGURE 68.—Distribution of *Festuca grayi.*

FIGURE 69.—Distribution of *Festuca arida.*

8. Festuca gráyi (Abrams) Piper. (Fig. 67, *A.*) Resembling *F. pacifica,* often somewhat stouter; sheaths and sometimes blades pubescent; glumes glabrous to sparsely villous; lemmas pubescent, puberulent or sometimes villous. ⊙ (*F. microstachys* var. *grayi* Abrams.)—Open ground and rocky slopes, Washington to southern California and Arizona (fig. 68).

9. Festuca árida Elmer. (Fig. 67, *B.*) Culms erect or spreading, mostly less than 15 cm tall; sheaths and blades glabrous, the blades loosely involute, mostly less than 4 cm long; panicle narrow, 2 to 5 cm long, the branches appressed or the lowermost somewhat spreading; glumes about equal, glabrous, 5 to 6 mm long; lemmas densely woolly, about 5 mm long; awn 5 to 10 mm long. ⊙ —Sandy or dry ground, rare, eastern Washington and Oregon, southwestern Idaho, northeastern California, and western Nevada (fig. 69).

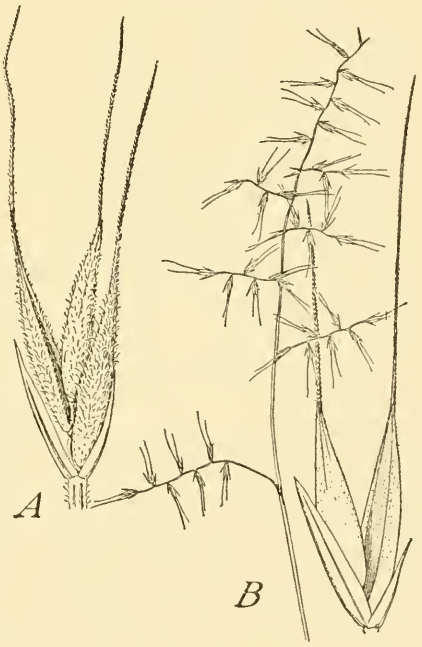

FIGURE 70.—*A, Festuca microstachys.* Spikelet, × 5. (Allen, Calif.) *B, F. reflexa.* Panicle, × ½; spikelet, × 5. (Brandegee 71, Calif.)

10. Festuca refléxa Buckl. (Fig. 70, *B.*) Culms 20 to 40 cm tall; sheaths glabrous or pubescent; blades narrow, flat to subinvolute, 2 to 10 cm long; panicle 5 to 12 cm long, the solitary branches and the spikelets all at length divaricate; spikelets mostly 1- to 3-flowered, 5 to 7 mm long; first glume 2 to 4 mm long, the second 4 to 5 mm long; lemmas glabrous or scaberulous, 5 to 6 mm long; awn usually 5 to 8 mm long. ⊙ —Mesas, rocky slopes, and wooded hills, Washington to southern California, east to Arizona and Utah (fig. 71).

11. Festuca micróstachys Nutt. (Fig. 70, *A*.) Resembling *F. reflexa;* glumes glabrous; lemmas pubescent. ⊙ —Open ground, Washington to California; rare.

FIGURE 71.—Distribution of *Festuca reflexa*.

FIGURE 72.—*Festuca eastwoodae*. Panicle, × ½; glumes, × 5. (Type.)

FIGURE 73.—*Festuca tracyi*, Panicle, × ½; glumes, × 5; floret, × 5. (Type.)

12. Festuca eastwoódae Piper. (Fig. 72.) Resembling *F. reflexa;* glumes hirsute; lemmas hirsute, the awn 4 to 5 mm long. ⊙ —Open ground, Oregon, Arizona, and California; rare.

13. Festuca trácyi Hitchc. (Fig. 73.) Resembling *F. reflexa;* glumes rather sparsely hispid-villous, the first 1.5 to 2 mm long, acute, the second 3 to 4 mm long, obtusish or abruptly acute; lemmas glabrous, about 4 mm long; awn 4 to 7 mm long. ⊙ —Open rocky ground, Washington (Bingen) and California (Kings and Napa Counties).

SECTION 2. EUFESTÚCA Griseb.

Perennials; culms simple; stamens 3.

14. Festuca subuliflóra Scribn. (Fig. 74.) Culms erect, slender, 60 to 100 cm tall; blades flat (or loosely involute in drying), lax, pubescent on the upper surface, those of the culm mostly 2 to 4 mm wide, those of the innovations narrower; panicle loose, lax, 10 to 20 cm long, nodding, the branches drooping, the lower naked at base; spikelets loosely 3- to 5-flowered, the rachilla pubescent or hispid, the internodes of the rachilla as much as 2 mm long; floret long-stipitate, the rachilla appearing to be jointed a short distance below the floret; glumes very narrow, acuminate, the first 3 to 4 mm, the second 4 to

FIGURE 74.—*Festuca subuliflora*. Panicle, × ½; spikelet, × 5. (Howell 19, Oreg.)

5 mm, long; lemmas scaberulous toward the apex, 6 to 8 mm long; awn somewhat flexuous, 10 to 15 mm long. 2l — Moist shady places from sea level to 1,000 m, British Columbia to northern California, mostly near the coast. Peculiar in the stipitate base of the lemma. Aspect of *F. subulata*.

FIGURE 75.—*Festuca subulata*. Panicle, × ½; floret, × 5. (Hitchcock 23511, Oreg.)

15. Festuca subuláta Trin. BEARDED FESCUE. (Fig. 75.) Culms erect, mostly 50 to 100 cm tall; blades flat, thin, lax, 3 to 10 mm wide; panicle loose, open, drooping, 15 to 40 cm long, the branches mostly in twos or threes, naked below, finally spreading or reflexed, the lower as much as 15 cm long; spikelets loosely 3- to 5-flowered; glumes narrow, acuminate, the first about 3 mm, the second about 5 mm, long; lemmas somewhat keeled, scaberulous toward the apex, the intermediate nerves obscure, the tip attenuate into an awn 5 to 20 mm long. 2l —Shady banks and moist thickets, up to 2,000 m, southeastern Alaska to Wyoming, Utah, and northern California (fig. 76).

FIGURE 76.—Distribution of *Festuca subulata*.

FIGURE 77.—*Festuca elmeri*. Panicle, × ½; spikelet, × 5. (Type.)

16. Festuca elméri Scribn. and Merr. (Fig. 77.) Culms loosely tufted, slender 40 to 100 cm tall, or even taller; blades flat, scabrous or pubescent on upper surface, 2 to 4 mm wide, those of the innovations narrower, more or less involute; panicle loose, open, 10 to 20 cm long, the branches slender, somewhat drooping, naked below, the lower as much as 10 cm long; spikelets 3 or 4-flowered; glumes lanceolate-acuminate, the first 2 to 2.5 mm, the second 3 to 4 mm, long; lemmas membranaceous, hispidulous, about 6 mm long, the nerves rather prominent, the apex minutely 2-toothed; awn 2 to 8 mm long. 2l — Wooded hillsides, up to 500 m, mostly in the Coast Ranges, Oregon to central California.

FESTUCA ELMERI var. CONFÉRTA (Hack.) Hitchc. More luxuriant; spikelets often 5- or 6-flowered and somewhat congested on the panicle branches. 2l (*F. jonesii* var. *conferta* Hack.)—Coast Ranges of California.

17. Festuca elátior L. MEADOW FESCUE. (Fig. 78.) Culms 50 to 120 cm tall; blades flat, 4 to 8 mm wide, scabrous above; panicle erect, or nodding at summit, 10 to 20 cm long, contracted

FIGURE 78.—*Festuca elatior.* Plant, × ½; spikelet and floret, × 5. (Amer. Gr. Nat. Herb. 488.)

after flowering, much-branched or nearly simple, the branches spikelet-bearing nearly to base; spikelets usually 6- to 8-flowered, 8 to 12 mm long; glumes 3 and 4 mm long, lanceolate; lemmas oblong-lan-

ceolate, coriaceous, 5 to 7 mm long, the scarious apex acutish, rarely short-awned. 2l (*Festuca pratensis* Huds.)—Meadows, roadsides, and waste places; introduced throughout the cooler parts of North America; native of Eurasia. Cultivated for meadow and pasture. Sometimes called English bluegrass. FESTUCA ELATIOR var. ARUNDINÁCEA (Schreb.) Wimm. Larger form with open panicles and spikelets usually with 4 or 5 florets. 2l —Introduced sparingly from Europe, New York to Washington.

FIGURE 79.—*Festuca kingii*. Plant, × ½, spikelet, × 5. (Osterhout 1897, Colo.)

Festuca gigantéa (L.) Vill. Blades broad, flat, thin; panicles open; lemmas long-awned, the awn flexuous and two or three times as long as the lemma. 2l Dobbs Ferry, N.Y.; adventive from Europe.

18. Festuca kíngii (S. Wats.) Cassidy. SPIKE FESCUE. (Fig. 79.) Culms in large dense bunches, stout, erect, 40 to 100 cm tall, occasionally producing short rhizomes, these usually wanting in herbarium specimens; sheaths smooth, striate; blades firm, flat or becoming loosely involute, coarsely striate, 3 to 6 mm wide; panicle narrow, erect, 7 to 20 cm long, the branches short, appressed, floriferous nearly to base; spikelets mostly 10 to 12 mm long; glumes broadly lanceolate, subscarious, nearly smooth, the first 3 to 4 mm long, the second a half longer; lemmas ovate, acuminate, convex, faintly nerved, scabrous, 5 to 8 mm long, awnless. 2l (*F. confinis* Vasey; *Hesperochloa kingii* Rydb.)—Dry mountains and hills, 2,000 to 3,500 m, Oregon to southern California, east to Montana and Colorado (fig. 80). FESTUCA KINGII var. RABIÓSA (Piper) Hitchc. Blades involute; lemmas short-awned. 2l —Known only from Wyoming (Crazy Womans Creek) and Montana (Beaverhead Forest).

FIGURE 80.—Distribution of *Festuca kingii*.

19. Festuca sorória Piper. (Fig. 81.) Culms erect, loosely tufted, 60 to 90 cm tall; blades flat, thin, smooth except the scabrous margins, 3 to 6 mm wide; panicle loose, open, nodding, or sometimes somewhat condensed, 10 to 15 cm long, the branches solitary or in twos, naked below; spikelets rather loosely 3- to 5-flowered; glumes lanceolate, the first about 3 mm, the second about 5 mm long; lemmas membrana-

ceous, somewhat keeled, scaberulous or nearly smooth, the nerves evident but not prominent, the apex tapering into a fine point or an awn as much as 2 mm long. 2l —Open woods, 2,000 to 3,000 m, southern Colorado and Utah to New Mexico and Arizona (fig. 82).

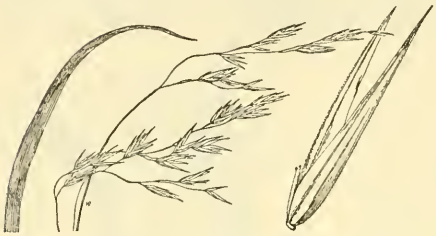

FIGURE 81.—*Festuca sororia.* Panicle, × ½; floret, × 5. (Baker 36, Colo.)

20. Festuca versúta Beal. (Fig. 83.) Culms slender, 50 to 100 cm tall; blades flat, mostly 2 to 5 mm wide; panicle open, 10 to 15 cm long, the spreading lower branches bearing a few spikelets above the middle; spikelets 2- to 5-flowered; glumes narrow, acuminate, nearly equal, 5 to 6 mm long; lemmas firm, obscurely nerved at maturity, 5 to 7 mm long, acute, awnless. 2l (*F. texana* Vasey; *F. johnsoni* Piper.)—Shady banks, Texas and Oklahoma.

FIGURE 82.—Distribution of *Festuca sororia.*

21. Festuca obtúsa Spreng. NODDING FESCUE. (Fig. 84.) Culms solitary or few in a tuft, mostly 50 to 100 cm tall; blades flat, 4 to 7 mm wide; panicle very loose and open, the branches spreading, spikelet-bearing toward the ends, the lower usually reflexed at maturity; spikelets 3- to 5,flowered; glumes about 3 and 4 mm long; lemmas coriaceous, rather turgid, about 4 mm long, obtuse or acutish, the nerves very obscure. 2l (*F. nutans* Spreng.)—Low or rocky woods, Quebec to Manitoba, south to northern Florida and eastern Texas (fig. 85).

FIGURE 83.—*Festuca versuta.* Panicle, × ½; spikelet, × 5. (Johnson, Tex.)

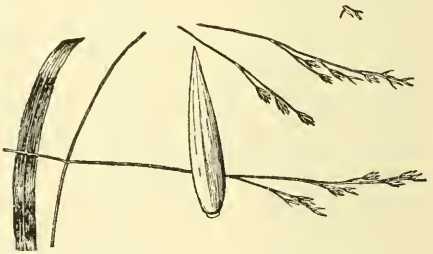

FIGURE 84.—*Festuca obtusa.* Panicle, × ½; floret, × 5. (Amer. Gr. Nat. Herb. 490, Md.)

FIGURE 85.—Distribution of *Festuca obtusa.*

22. Festuca shórtii Kunth. (Fig. 86.) Resembling *F. obtusa;* culms tufted; panicle nodding, less open than in *F. obtusa*, the branches arched-drooping, the spikelets somewhat crowded toward the ends; spikelets 3- to 6-flowered. 2l —Prairies, low, open ground, and

thickets, Pennsylvania and South Carolina to Iowa and eastern Texas (fig. 87.)

23. Festuca thurbéri Vasey. THURBER FESCUE. (Fig. 88.) Culms densely tufted, rather stout, erect, 60 to 90 cm tall; ligule 2 to 4 mm long; blades involute, scabrous, firm, erect; panicle 10 to 15 cm long, the branches usually solitary, somewhat remote, ascending or spreading, naked below; spikelets 3- to 6-flowered; glumes rather broad, about 4 and 5 mm long; lemmas rather firm, faintly nerved, glabrous or nearly so, acute or cuspidate, 7 to 8 mm long. 2l —Dry slopes and rocky hills, 2,500 to 3,500 m, Wyoming to New Mexico and Utah (fig. 89).

FIGURE 87.—Distribution of *Festuca shortii.*

FIGURE 86.—*Festuca shortii.* Panicle, × ½; floret, × 5. (Palmer 34672, Mo.)

24. Festuca liguláta Swallen. (Fig. 90.) Culms slender, loosely tufted, erect from a decumbent often rhizomatous base, scabrous below the panicle; sheaths glabrous; blades 6 to 20 cm long, those of the innovations as much as 30 cm long, flat and 1 to 2 mm wide or mostly involute, scabrous, rather firm; ligule 3 to 3.5 mm long; panicle 6 to 10 cm long, the 1 or 2 scabrous branches stiffly ascending or spreading, few-flowered, naked below; spikelets 6 mm long, 2- to 3-flowered, the pedicels (mostly shorter than the spikelets) appressed; glumes acute or acutish, scabrous, the first 3 mm long, 1-nerved, the second 4 mm long, 3-nerved; lemmas 4 to 5 mm long, acutish, scabrous, obscurely nerved, awnless, the palea slightly exceeding it. 2l —Moist shady slopes, Guadalupe and Chisos Mountains, Tex.

FIGURE 88.—*Festuca thurberi.* Panicle, × ½; spikelet, × 5. (Pammel, Colo.)

FIGURE 89.—Distribution of *Festuca thurberi.*

25. Festuca scabrélla Torr. ROUGH FESCUE. (Fig. 91.) Culms densely tufted, erect, 30 to 90 cm tall; ligule very short; blades firm, erect, scabrous, involute, or those of the culm sometimes flat but narrow; panicle narrow, 5 to 15 cm long, the branches solitary or in pairs, the lowermost sometimes in threes, appressed or ascending, naked below; spikelets 4- to 6-flowered; glumes somewhat unequal, lanceolate, 7 to 9 mm long; lemmas firm, rather strongly nerved, scaberulous, acute to cuspidate or short-awned, 7 to 10 mm long. 2l (*F. hallii*

Piper.)—Prairies, hillsides, and open woods, up to about 2,000 m (probably alpine in Colorado), Newfoundland to British Columbia, south to Oregon, North Dakota, and Colorado (fig. 92.) FESTUCA SCABRÉLLA var. MÁJOR Vasey. Culms on the average taller; panicle larger and more spreading; lemmas more strongly nerved. 2↓ (*F. campestris* Rydb.)—Hills and dry woods, Michigan (Roscommon), Montana to Washington.

FIGURE 90.—*Festuca ligulata*. Plant, × ½; floret, × 5. (Type.)

26. Festuca californica Vasey. CALIFORNIA FESCUE. (Fig. 93.) Culms tufted, rather stout, 60 to 120 cm tall; sheaths somewhat scabrous, the collar pubescent or pilose; blades firm, usually involute, sometimes flat, scabrous; panicle open, 10 to 30 cm long, the rather remote branches usually in pairs, spreading or drooping, naked below; spikelets mostly 4- or 5-flowered; glumes somewhat unequal, 5 to 8 mm long; lemmas firm, faintly nerved, scaberulous, acuminate or short-awned. 2↓ (*F. aristulata* Shear.)—Open dry ground, thickets and open woods, up to about 1,500 m, Oregon and California, west of the Sierra Nevada. A smaller form with pubescent lower sheaths, and shorter

FIGURE 91.—*Festuca scabrella*. Panicle, × ½; floret, × 5. (Rydberg 2106, Mont.)

FIGURE 92.—Distribution of *Festuca scabrella*.

mostly glabrous blades, has been called *F. californica* var. *parishii*

FIGURE 93.—*Festuca californica*. Panicle, × ½; floret, × 5. (Elmer 4431, Calif.)

(Piper) Hitchc.—Oregon and California (San Bernardino Mountains).

27. Festuca dasýclada Hack. (Fig. 94.) Culms 20 to 40 cm tall; blades folded, about 2 mm wide when spread, those of the culm 4 to 6 cm long, those of the innovations 10 to 15 cm long; panicle open, 7 to 12 cm long, the branches rather stiffly and divaricately spreading, softly pubescent; angles ciliate; spikelets pale, long-pediceled, 2-flowered; glumes lanceolate, acuminate, the first about 4 mm, the second about 6 mm long; lemmas rather thin, somewhat keeled, rather strongly nerved, scaberulous, about 6 mm long; awn about 2 mm long, from between 2 minute teeth. ♃ —Rocky slopes, rare, Utah.

FIGURE 94.—*Festuca dasyclada.* Panicle, × ½; glumes and floret, × 5. (Dupl. type.)

FESTUCA RIGÉSCENS (Presl) Kunth. Densely tufted, about 30 cm tall; blades firm, involute, sharp-pointed; panicle narrow, few-flowered, 5 to 10 cm long; spikelets about 3-flowered, 6 to 7 mm long; lemmas ovate, thick, convex, awnless or mucronate, 4 to 4.5 mm long. ♃ —There is a single specimen of this species in the United States National Herbarium, labeled "Arizona, Tracy?" On the sheet is a note made by Professor Piper (Feb. 12, 1904) quoting Tracy, "In open pine woods 4 miles southeast of Flagstaff, about June 20, 1887." This agrees exactly with specimens of this species from Peru, whence originally described. Since the species is not known north of Peru, except from this specimen, it seems probable that the label has been misplaced.

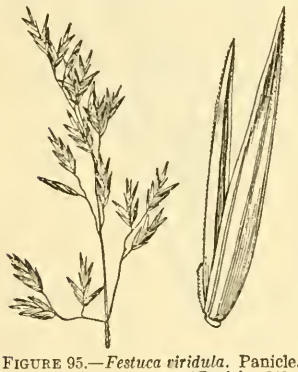

FIGURE 95.—*Festuca viridula.* Panicle, × ½; floret, × 5. (Cusick 2431, Oreg.)

28. Festuca virídula Vasey. GREENLEAF FESCUE. (Fig. 95.) Culms rather loosely tufted, erect, 50 to 100 cm tall; blades soft, erect, those of the culm flat or loosely involute, those of the innovations slender, involute; panicle open, 10 to 15 cm long, the branches mostly in pairs, ascending or spreading, slender, somewhat remote, naked below; spikelets 3- to 6-flowered; glumes lanceolate, somewhat unequal, 5 to 7 mm long; lemmas membranaceous, acute or cuspidate, glabrous, 6 to 8 mm long. ♃ —Mountain meadows and open slopes, 1,000 to 2,000 m, British Columbia to Alberta, south to central California and Idaho (fig. 96). An important forage grass in the mountains of the Northwestern States. *Festuca howellii* Hack., differing from *F. viridula* in having more scabrous lemmas and awns 2 mm long, does not seem sufficiently distinct to be recognized as a species. ♃ —Known from a single collection (Josephine County, Oreg.).

FIGURE 96.—Distribution of *Festuca viridula.*

FIGURE 97.—*Festuca rubra*. Plant, × ½; spikelet and floret, × 5. (Hitchcock 4201, Alaska.)

29. Festuca rúbra L. RED FESCUE. (Fig. 97.) Culms usually loosely tufted, bent or decumbent at the reddish or purplish base, occasionally closely tufted, erect to ascending, 40 to 100 cm tall; lower sheaths brown and fibrillose; blades smooth, soft, usually folded or involute; panicle 3 to 20 cm long, usually contracted and narrow, the branches mostly erect or ascending; spikelets 4- to 6-flowered, pale green or glaucous, often purple-tinged; lemmas 5 to 7 mm long, smooth, or scabrous toward apex, bearing an awn about half as long. 2l —

FIGURE 98.—Distribution of *Festuca rubra*.

Meadows, hills, bogs, and marshes, in the cooler parts of the northern hemisphere, extending south in the Coast Ranges to Monterey, in the Sierra Nevada to the San Bernardino Mountains, in the Rocky Mountains to Colorado, San Francisco Mountains of Arizona, in the Allegheny Mountains and in the Atlantic coastal marshes to Georgia (fig. 98); Eurasia, North Africa. Occasionally used in grass mixtures for pastures in the Northern States. FESTUCA RUBRA var. LANUGINÓSA Mert. and Koch. Lemmas pubescent. 2l —Oregon to Wyoming and northward; Michigan, Vermont to Connecticut; Europe. A proliferous form (*F. rubra* var. *prolifera* Piper, *F. prolifera* Fernald) is found in the White Mountains of New Hampshire, in Maine and northward. FESTUCA RUBRA var. COMMUTÁTA Gaud. (*F. fallax* Thuill.) CHEWINGS FESCUE. A form with more erect culms, producing a firmer sod, commonly cultivated in New Zealand and occasionally in the United States. 2l

FIGURE 99.—*Festuca occidentalis*. Panicle, × ½; spikelet, × 5. (Piper 4908, Wash.)

FESTUCA RUBRA var. HETEROPHÝLLA (Lam.) Mut. SHADE FESCUE. Densely tufted; basal blades filiform; culm blades flat. 2l Used for lawns in shady places. Europe.

30. Festuca occidentális Hook. WESTERN FESCUE. (Fig. 99.) Culms tufted, erect, slender, 40 to 100 cm tall; blades mostly basal, slender, involute, sulcate, soft, smooth or nearly so; panicle loose, 7 to 20 cm long, often drooping above, the branches solitary or in pairs; spikelets loosely 3- to 5-flowered, 6 to 10 mm long, mostly

FIGURE 100.—Distribution of *Festuca occidentalis*.

on slender pedicels; lemmas rather thin, 5 to 6 mm long, scaberulous toward the apex, attenuate into a slender awn about as long or longer. 2↓ —Dry rocky wooded slopes and banks, British Columbia to central California, east to Wyoming, northern Michigan, and western Ontario (fig. 100).

FIGURE 101.—*Festuca ovina.* Panicle, × ½; floret, × 5 (Robbins 8692, Colo.)

31. Festuca ovína L. SHEEP FESCUE. (Fig. 101.) Culms densely tufted, usually 20 to 40 cm tall; blades slender, involute, from very scabrous to glabrous, the innovations numerous in a basal cluster, 5 to 10 cm long or sometimes longer; panicle narrow, sometimes almost spikelike, 5 to 8 cm long, sometimes longer; spikelets mostly 4- or 5-flowered; lemmas about 4 to 5 mm long, short-awned. 2↓ (*F. saximontana* Rydb.; *F. calligera* Rydb.; *F. minutiflora* Rydb., a rare form with small florets; *F. ovina* var. *pseudovina* Hack. of Piper's revision of *Festuca.*)—Open woods and stony slopes, North Dakota to Washington and Alaska, south to Arizona and New Mexico; introduced eastward through Michigan, Maine, Illinois, and South Carolina (fig. 102). Eurasia. *Festuca ovina, F. ovina* var. *duriuscula,* and *F. capillata* are occasionally cultivated in lawn mixtures.

FESTUCA OVINA var. DURIÚSCULA (L.) Koch. HARD FESCUE. Blades smooth, wider and firmer than in *F. ovina.* 2↓ —Maine to Iowa and Virginia; introduced from Europe.

FIGURE 102.—Distribution of *Festuca ovina.*

FESTUCA OVINA var. BRACHYPHÝLLA (Schult.) Piper. ALPINE FESCUE. An alpine and high northern form differing in the lower culms, mostly 5 to 20 cm tall, and the smooth short rather lax blades. 2↓ (*F. brachyphylla* Schult.; *F. ovina* var. *supina* Hack. of Piper's revision of *Festuca.*)—Rocky slopes, at high altitudes, mostly above timber line in the United States, arctic regions south to San Bernardino Mountains, San Francisco Mountains and, in the Rocky Mountains, to northern New Mexico; also in the high mountains of Vermont, New Hampshire, and New York.

FIGURE 103.—*Festuca capillata.* Plant, × ¼; floret, × 5. (Hitchcock 23624, Newf.)

FESTUCA OVINA var. GLAÚCA (Lam.) Koch. BLUE FESCUE. Blades elongate, glaucous. 2↓ (*F. glauca* Lam.)—Cultivated as a border plant.

32. Festuca capillâta Lam. HAIR FESCUE. (Fig. 103.) Densely tufted, more slender and lower than *F. ovina;* blades capillary, flexuous, usually more than half as long as the culm; spikelets smaller; lemmas about 3 mm long, awnless. 2↓ —Lawns and waste places, Newfoundland and Maine to North Carolina and Illinois; Oregon; introduced from Europe.

33. Festuca idahoénsis Elmer. BLUEBUNCH FESCUE. (Fig. 104.) Culms usually densely tufted in large bunches, 30 to 100 cm tall; blades numerous, usually elongate, very scabrous, rarely smooth, filiform, involute; panicle narrow, 10 to 20 cm long, the branches ascending or appressed, somewhat spreading in anthesis; spike-

lets mostly 5- to 7-flowered; lemmas nearly terete, about 7 mm long; awn usually 2 to 4 mm long. ♃ (*F. ovina* var. *ingrata* Beal.)—Open woods and rocky slopes, British Columbia to Alberta, south to northern New Mexico and Arizona and central California (fig. 105).

34. Festuca arizónica Vasey. ARIZONA FESCUE. (Fig. 106.) Resembling *F. idahoensis;* differing in the stiffer glaucous foliage, somewhat smaller awnless or nearly awnless lemmas. ♃ —Open pine woods, Arizona, Nevada, New Mexico, and Colorado (fig. 107). Often called pinegrass.

FIGURE 105.—Distribution of *Festuca idahoensis*

FESTUCA AMETHÝSTINA L. Slender tufted perennial; blades filiform, 15 to 25 cm long; panicle 5 to 10 cm long, rather narrow; spikelets about as in *F. ovina*, often purplish. ♃ —Sometimes cultivated for ornament. Europe.

FESTUCA GENICULÁTA (L.) Cav. Annual; culms slender, geniculate below, 20 to 50 cm tall; panicle 3 to 6 cm long, rather compact; spikelets awned. ⊙ —Sometimes cultivated for ornament. Portugal.

FIGURE 104.—*Festuca idahoensis.* Plant, × ½; floret, × 5. (Heller 3318, Idaho.)

4. SCLERÓPOA Griseb.

Spikelets several-flowered, linear, somewhat compressed, the thick rachilla disarticulating above the glumes and between the florets; glumes unequal, short, acutish, strongly nerved, the first 1-nerved, the second 3-nerved; lemmas nearly terete, obscurely 5-nerved, obtuse, slightly scarious at the tip. Annuals with slightly branched 1-sided panicles. Type species, *Scleropoa rigida.* Name from Greek *skleros*, hard, and *poa*, grass, alluding to the stiff panicle.

1. Scleropoa rígida (L.) Griseb. (Fig. 108.) Culms erect or spreading, 10 to 20 cm tall; blades flat, 1 to 2 mm wide; panicles narrow, stiff, condensed, 5 to 10 cm long, the branches short, floriferous to base, these and the thick pedicels somewhat divaricately spreading in anthesis; spikelets 4- to 10-flowered, 5 to 8 mm long; glumes about 2 mm long; lemmas about 2.5 mm long. ⊙ —Waste places and fields, sparingly introduced from Europe, Massachusetts; Florida to Mississippi; South Dakota; Washington to California.

FIGURE 107.—Distribution of *Festuca arizonica.*

FIGURE 106.—*Festuca arizonica.* Panicle, × ½; floret, × 5. (Leiberg 5685, Ariz.)

5. PUCCINÉLLIA Parl. ALKALI-GRASS

Spikelets several-flowered, usually terete or subterete, the rachilla disarticulating above the glumes and between the florets; glumes unequal, shorter than the first lemma, obtuse or acute, rather firm,

often scarious at tip, the first 1-nerved or sometimes 3-nerved, the second 3-nerved; lemmas usually firm, rounded on the back, obtuse or acute, rarely acuminate, usually scarious and often erose at the tip, glabrous or puberulent toward base, rarely pubescent on the nerves, 5-nerved, the nerves parallel, indistinct, rarely rather prominent; palea about as long as the lemma or somewhat shorter. Low

FIGURE 108.—*Scleropoa rigida*. Plant, × 1; two views of floret, × 10. (Cocks, Miss.)

pale smooth tufted annuals or perennials with narrow to open panicles. Type species, *Puccinellia distans*. Named for Prof. Benedetto Puccinelli.

The species of the interior are grazed by stock. One, *P. nuttalliana*, furnishes considerable forage in the regions where it is common. A form of this, called Zawadke alkali-grass, is cultivated in Montana.

Lemmas obtuse, pubescent on the nerves for half or three-fourths their length.
Dwarf annual ..... 1. P. PARISHII.
Lemmas glabrous or, if pubescent, the hairs not confined to the nerves.
Panicles narrow, strict, the branches appressed, mostly with one spikelet; annual, mostly less than 20 cm tall; lemmas acute, more or less pubescent ..... 2. P. SIMPLEX.
Panicles narrow or open, not strict; annual or perennial; lemmas glabrous or pubescent only at base.
Panicles ellipsoid, rather compact, less than 10 cm long, the branches floriferous nearly to base. Lemmas rather coriaceous; culms rather stout.
Spikelets 5 to 8 mm long; lemmas 3 to 3.5 mm long .. 3. P. RUPESTRIS.
Spikelets 3 to 4 mm long; lemmas 2 to 2.5 mm long.
4. P. FASCICULATA.
Panicles pyramidal or elongate, some of the branches naked below, or reduced, narrow, and few-flowered.
Leaves mostly in a short basal tuft, the blades involute, 5 to 10 cm long.
Panicle 5 to 10 cm long, open and spreading; lemmas 3.5 mm long, glabrous, acute ..... 5. P. LEMMONI.
Leaves distributed, not in a basal tuft.
Anthers about 2 mm long. Lemmas 4 to 5 mm long, pubescent at base ..... 6. P. MARITIMA.
Anthers 1 mm long or less.
Lemmas about 2 mm long; panicle open; the slender branches spreading or reflexed.
Lemmas broad, obtuse or truncate, not narrowed above; lower panicle branches usually reflexed ..... 7. P. DISTANS.
Lemmas narrow, narrowed into an obtuse apex; panicle branches spreading, usually not reflexed ..... 8. P. NUTTALLIANA.
Lemmas 3 to 4 mm long; panicle narrow, the branches ascending or finally spreading.
Plants lax, usually 10 to 30 cm tall; panicle 5 to 10 cm long, the branches finally spreading ..... 9. P. PUMILA.
Plants usually 40 to 60 cm tall; panicle 10 to 20 cm long, the branches ascending or appressed ..... 10. P. NUTKAENSIS.

1. Puccinellia parishii Hitchc. (Fig. 109.) Annual; culms 3 to 10 cm tall; blades flat to subinvolute, less than 1 mm wide; panicle narrow, few-flowered, 1 to 4 cm long; spikelets 3- to 6-flowered, 3 to 5 mm long; lemmas about 2 mm long, obtuse to truncate, scarious and somewhat erose at the tip, pubescent on the mid and lateral nerves nearly to the apex, and on the intermediate nerves about half way. ⊙ —Known only from Rabbit Springs, San Bernardino County, Calif.

FIGURE 109.—*Puccinellia parishii*. Panicle, × 1; floret, × 10. (Type.)

2. Puccinellia simplex Scribn. (Fig. 110.) Annual; culms 7 to 20 cm tall; blades narrow, soft, flat; panicle narrow, about half the length of the entire plant, the branches few, short, appressed, mostly with 1 spikelet; spikelets 6 to 8 mm long, appressed; glumes strongly 3-nerved, 1 and 2 mm long; lemmas 2.5 mm long, tapering from below the middle to the acute apex, more or less pubescent over the back. ⊙ —Alkaline soil, California; rare.

3. Puccinellia rupestris (With.) Fern. and Weath. (Fig. 111.) Annual; culms rather stout, mostly 10 to 20 cm tall; blades flat, 2 to 6 mm wide; panicle ellipsoid, glaucous, rather dense, mostly 3 to 6 cm long, the branches mostly not more than 1.5 cm long, stiffly ascending, floriferous nearly to base; spikelets 3- to 5-flowered, 5 to 8 mm long, sessile or nearly so; glumes 3- to 5-nerved, 1.5 and 2.5 mm long; lemmas 3 to 3.5 mm

long, firm, obscurely nerved, glabrous, obtuse, the apex entire or nearly so. ⊙ —Ballast near New York and Philadelphia. Europe.

4. Puccinellia fasciculáta (Torr.) Bicknell. (Fig. 112.) Apparently perennial; culms rather stout, 20 to 50 cm tall, sometimes taller; blades flat, folded, or subinvolute, 2 to 4 mm wide; panicle ellipsoid, 5 to 15 cm long, the branches fascicled, rather stiffly ascending,

FIGURE 110.—*Puccinellia simplex.* Plant, × 1; floret, × 10. (Type.)

FIGURE 111.—*Puccinellia rupestris.* Panicle, × 1; floret, × 10. (Martindale, N.J.)

some naked at base but with short basal branchlets, all rather densely flowered; spikelets 2- to 5-flowered, 3 to 4 mm long; glumes ovate, 1 and 1.5 mm long; lemmas 2 to 2.5 mm long, firm, obtuse. ♃ (*P. borreri* Hitchc.)—Salt marshes along the coast, Nova Scotia to Delaware; Utah (fig. 113); Europe.

5. Puccinellia lemmóni (Vasey) Scribn. (Fig. 114). Perennial; culms erect, slender, 15 to 30 cm tall; leaves mostly in an erect basal

tuft, the slender blades involute, 5 to 10 cm long; panicle pyramidal, open, 5 to 10 cm long, the slender flexuous branches fascicled, the lower spreading, the longer ones naked on the lower half; spikelets narrow, 3- to 5-flowered, the rachilla often exposed; glumes about 1 and 2 mm long; lemmas narrow, acute, glabrous, about 3.5 mm long; anthers 1.5 mm long. ♃ —Moist alkaline soil, southern Idaho and Washington to Utah and California (fig. 115).

FIGURE 112.—*Puccinellia fasciculata.* Panicle, × 1; floret, × 10. (Stebbins, Maine.)

6. Puccinellia marítima (Huds.) Parl. (Fig. 116). Perennial; culms erect, rather coarse, 20 to 40 cm tall, sometimes taller; blades 1 to 2 mm wide, usually becoming involute; panicle mostly 10 to 20 cm long, the branches ascending or appressed, or spreading in anthesis; spikelets 4- to 10-flowered; glumes 3-nerved, 2 to 3 and 3 to 4 mm long; lemmas 4 to 5 mm long, pubescent on the base of the lateral nerves and sometimes sparingly between the nerves; anthers 1.5 to 2 mm long. ♃ —Salt marshes and brackish shores, Nova Scotia to Rhode Island; Washington; on ballast, Philadelphia (fig. 117); Europe.

7. Puccinellia dístans (L.) Parl. (Fig. 118.) Perennial; culms erect or decumbent at base, 20 to 40 cm tall, sometimes taller; blades flat or more or less involute, mostly 2 to 4 mm wide; panicle pyramidal, loose, 5 to 15 cm long, the branches fascicled, rather distant, the lower spreading or finally reflexed, the longer ones naked half their length or more; spikelets 4- to 6-flowered, 4 to 5 mm long; glumes 1 and 2 mm long; lemmas rather thin, obtuse or truncate, 1.5 or usually about 2 mm long, with a few short hairs at base; anthers

FIGURE 113.—Distribution of *Puccinellia fasciculata.*

FIGURE 114.—*Puccinellia lemmoni.* Panicle, × 1; floret, × 10. (Jones 4115, Nev.)

about 0.8 mm long. ♃ —Moist, more or less alkaline soil, Quebec to Alaska, south to Maryland, Michigan, Wisconsin, and North

Dakota; Washington, south to New Mexico and California (fig. 119); introduced from Eurasia. The more slender specimens are the form described as *P. distans* var. *tenuis* (Uechtritz) Fern. and Weath.

8. Puccinellia nuttalliána (Schult.) Hitchc. NUTTALL ALKALI-GRASS. (Fig. 120.) Perennial; culms usually erect, slender, rather stiff and firm at base, mostly 30 to 60 cm rarely to 1 m tall; blades 1 to 3 mm wide, flat, or becoming involute; panicle pyramidal, open, mostly 10 to 20 cm long, the distant scabrous branches fascicled, spreading, naked below, as much as 10 cm long; spikelets 3- to 6-flowered, 4 to 7 mm long, the florets rather distant, the rachilla often exposed; pedicels scabrous; glumes 1.5 and 2 mm long; lemmas 2 to 3 mm long, rather narrow, somewhat narrowed into an obtuse apex; anthers about 0.7 mm long. 2l (*P. airoides* Wats. and Coult.)—Moist, usually alkaline soil, Minnesota to British Columbia, south to Kansas, New Mexico, and California; introduced in Maine and Vermont (fig. 121). The form with lemmas 2.5 to 3 mm long has been called *P. cusickii* Weatherby.—Alberta to Wyoming and Oregon.

FIGURE 115.—Distribution of *Puccinellia lemmoni*.

FIGURE 116.—*Puccinellia maritima*. Plant, × 1; floret, × 10. (Fernald and Long 20051, Nova Scotia.)

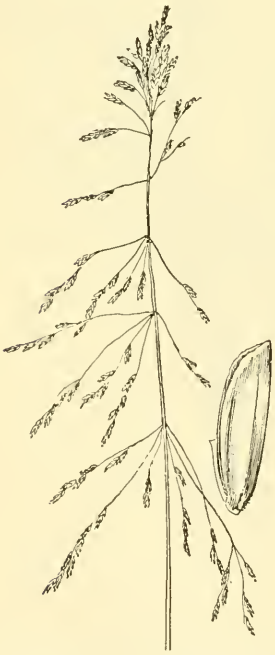

FIGURE 118.—*Puccinellia distans*. Panicle, × ½; floret, × 10. (Schuette, Wis.)

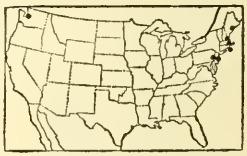

FIGURE 117.—Distribution of *Puccinellia maritima*.

9. Puccinellia púmila (Vasey) Hitchc. (Fig. 122.) Perennial; culms lax, erect or ascending from a decumbent base, 10 to 30 cm tall; blades rather soft, mostly flat, 1 to 2 mm wide; panicle pyramidal, open, mostly 5 to 10 cm long, the lower branches naked below, usually finally spreading or even reflexed; spikelets 4- to 6-flowered; glumes 1.5 and 2.5 mm long; lemmas 3 to 4 mm long, rather broad, narrowed toward the obtuse nearly entire apex, obscurely pubescent near base or glabrous; anthers 0.8 to 1 mm

long. 2l (*P. paupercula* Fern. and Weath., *P. paupercula* var. *alaskana* Fern. and Weath.)—Salt marshes and shores, Labrador to

FIGURE 119.—Distribution of *Puccinellia distans.*

Alaska, south to Connecticut and Oregon (fig. 123).

FIGURE 120.—*Puccinellia nuttalliana.* Panicle, × 1; floret, × 10. (Rydberg 2135, Mont.)

10. Puccinellia nutkaénsis (Presl) Fern. and Weath. (Fig. 124.) Perennial; culms rather stout, 40 to 70 cm tall; blades 1 to 2 mm wide, subinvolute; panicle narrow, 10 to 20 cm long, usually included at base, the lower branches usually as much as 7 cm long; spikelets 4- to 9-flowered, 6 to 10 mm long; glumes about 1.5 and 2 mm long; lemmas 3 to 4 mm long, narrowed to an obtuse apex, the tip minutely fimbriate, the base with a few hairs; anthers about 0.7 mm long. 2l —Salt marshes and saline soil near the coast, Alaska to central California.

FIGURE 121.—Distribution of *Puccinellia nuttalliana.*

FIGURE 122.—*Puccinellia pumila.* Plant, × 1; floret, × 10. (Type.)

6. GLYCÉRIA R. Br.
MANNAGRASS

(*Panicularia* Heist.)

Spikelets few- to many-flowered, subterete or slightly compressed, the rachilla disarticulating above the glumes and between the florets; glumes unequal, short, obtuse or acute, usually scarious, mostly 1-nerved; lemmas broad, convex on the back, firm, usually obtuse; scarious at the apex, 5- to 9-nerved, the nerves

parallel, usually prominent. Usually tall aquatic or marsh perennials, with creeping and rooting bases or with creeping rhizomes, simple culms, closed or partly closed sheaths, flat blades, and open or contracted panicles. Type species, *Glyceria fluitans*. Name from the Greek *glukeros*, sweet, the seed of the type species being sweet.

FIGURE 124.—*Puccinellia nutkaensis*. Panicle, × 1; floret, × 10. (Macoun 66, Br. Col.)

The species are all palatable grasses but are usually of limited distribution and most of them are confined to marshes or wet land. *Glyceria elata*, tall mannagrass, is a valuable component of the forage in moist woods of the Northwestern States. *G. striata*, fowl mannagrass, widely distributed, *G. grandis*, American mannagrass, in the Northern States, and *G. pauciflora*, weak mannagrass, of the Northwest, are marsh species but are often grazed.

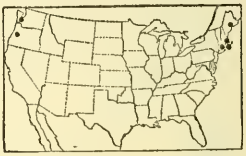

FIGURE 123.—Distribution of *Puccinellia pumila*.

Spikelets linear, nearly terete, usually as much as 1 cm long, appressed on short pedicels; panicles narrow, erect ..... SECTION 1. EUGLYCERIA.

Spikelets ovate or oblong, more or less compressed, usually not more than 5 mm long; panicles usually nodding ..... SECTION 2. HYDROPOA.

Section 1. Euglyceria

Lemmas acute, much exceeded by the palea ..... 1. G. ACUTIFLORA.

Lemmas obtuse; palea about as long as the lemma (or longer in *G. septentrionalis* and *G. fluitans*).

Lemmas glabrous between the slightly scabrous nerves ..... 2. G. BOREALIS.

Lemmas scaberulous or hirtellous between the usually distinctly scabrous nerves.

Lemmas about 3 mm long, broadly rounded at the summit.

First glume 1.5 mm long; lemmas scaberulous ..... 3. G. LEPTOSTACHYA.

First glume 2 to 2.5 mm long; lemmas hirtellous ..... 4. G. ARKANSANA.

Lemmas 4 to 7 mm long.

Lemmas pale or green, not tinged with purple, about 4 mm long; palea usually exceeding the lemma; Eastern States. 5. G. SEPTENTRIONALIS.

Lemmas usually tinged with purple near the tip, 4 to 6 mm long; palea rarely exceeding the lemma; Western States ..... 7. G. OCCIDENTALIS.

Lemmas slightly tinged with purple near the tip, 5 to 6 mm long; palea about as long as the lemma, sometimes slightly exceeding it; Northeastern States ..... 6. G. FLUITANS.

Section 2. Hydropoa

Lemmas with 5 prominent nerves.

Panicle ovate or pyramidal, open ..... 8. G. PAUCIFLORA.

Panicle narrow, the branches ascending ..... 9. G. ERECTA.

Lemmas with 7 usually prominent nerves.

Panicle contracted, narrow.

Lemmas about 3 to 4 mm long; panicle oblong, dense, usually not more than 10 cm long ..... 10. G. OBTUSA.

Lemmas 2 to 2.5 mm long; panicle rather loose, nodding, 15 to 25 cm long ..... 11. G. MELICARIA.
Panicle open, lax.
Nerves of lemma evident but not prominent ..... 12. G. CANADENSIS.
Nerves of lemma prominent.
Culms decumbent, weak.
Blades 4 to 8 mm wide; anthers 1 mm long ..... 17. G. PALLIDA.
Blades 1 to 3 mm wide; anthers 0.2 to 0.5 mm long .. 18. G. NEOGAEA.
Culms erect, usually stout.
First glume 1 mm long or less.
Blades 2 to 4 mm wide, sometimes to 8 mm, rather firm, often folded; first glume 0.5 mm long ..... 13. G. STRIATA.
Blades 6 to 12 mm wide, flat, thin, lax; first glume about 1 mm long.
Lemma narrowed into a hyaline tip with no colored border. 14. G. ELATA.
Lemma broad at summit with a purple zone just below. 15. G. OTISII.
First glume 1.5 mm long. Panicle large, compound .. 16. G. GRANDIS.

SECTION 1. EUGLYCÉRIA Griseb.

Spikelets linear, nearly terete, usually more than 1 cm long, appressed on short pedicels; panicles narrow, erect, the branches appressed or ascending after anthesis. The species of Euglyceria, with the exception of *Glyceria acutiflora*, are very closely allied and appear to intergrade.

FIGURE 126.—Distribution of *Glyceria acutiflora*.

FIGURE 125.—*Glyceria acutiflora*. Panicle, × 1; floret, × 10. (Knowlton 866, Mass.)

1. Glyceria acutiflóra Torr. (Fig. 125.) Culms compressed, lax, creeping and rooting below, 50 to 100 cm long; blades flat, lax, 10 to 15 cm long, 3 to 6 mm wide, scabrous on the upper surface; panicle 15 to 35 cm long, often partly included, the branches rather stiff, bearing 1 or 2 spikelets, or the lower 3 or more; spikelets 5- to 12-flowered, 2 to 4 cm long, 1 to 2 mm wide, the lateral pedicels 1 to 3 mm long; glumes about 2 and 5 mm long; lemmas 7-nerved, acute, scabrous, 6 to 8 mm long, exceeded by the acuminate, 2-toothed paleas. 2|. (*Panicularia acutiflora* Kuntze.)—Wet soil and shallow water, New Hampshire to Delaware, west to Michigan and Tennessee (fig. 126); also northeastern Asia.

FIGURE 127.—*Glyceria borealis*. Panicle, × 1; floret, × 10. (Fernald 193, Maine.)

2. Glyceria boreális (Nash) Batchelder. NORTHERN MANNAGRASS. (Fig. 127.) Culms erect or decumbent at base, slender, 60 to 100 cm tall; blades flat or folded, usually 2 to 4 mm wide, sometimes

wider; panicle mostly 20 to 40 cm long, the branches as much as 10 cm long, bearing several appressed spikelets; spikelets mostly 6- to 12-flowered, 1 to 1.5 cm long; glumes about 1.5 and 3 mm long; lemmas rather thin, obtuse, 3 to 4 mm long, strongly 7-nerved, scarious at the tip, glabrous between the hispidulous nerves. 2↓ (*Panicularia borealis* Nash.)—Wet places and shallow water, Newfoundland to southeast Alaska, south to Connecticut, northwestern Indiana, Iowa, South Dakota, and in the mountains to New Mexico and central California (fig. 128).

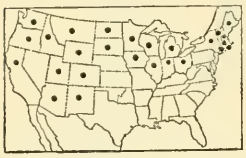

FIGURE 128.—Distribution of *Glyceria borealis*.

3. Glyceria leptostáchya Buckl. (Fig. 129.) Culms 1 to 1.5 m tall, rather stout or succulent; sheaths slightly rough; blades flat, scaberulous on the upper surface, 4 to 7 mm wide, rarely 1 cm wide; panicle 20 to 40 cm long, the branches ascending, mostly in 2's or 3's, several-flowered, often bearing secondary branchlets; spikelets 1 to 2 cm long, 8- to 14-flowered, often purplish; glumes 1.5 and 3 mm long; lemmas firm, broadly rounded toward apex, about 3 mm long, 7-nerved, scaberulous on the nerves and between them. 2↓ (*Panicularia davyi* Merr.)—Shallow water, up to 1,200 m, rare, Washington to central California.

FIGURE 129.—*Glyceria leptostachya*. Panicle, × 1; floret, × 10. (Heller 5606, Calif.)

4. Glyceria arkansána Fernald. (Fig. 130.) Resembling *G. septentrionalis;* first glume 2 to 2.5 mm long; lemmas 3 mm long, hirtellous rather than scaberulous. 2↓ Wet ground, Louisiana, Arkansas, and Texas (fide Fernald). There is a specimen labeled "western New York"; this locality should be confirmed.

FIGURE 130.—*Glyceria arkansana*. Panicle, × 1; floret, × 10. (Ball 362, La.)

5. Glyceria septentrionális Hitchc. EASTERN MANNAGRASS. (Fig. 131.) Culms 1 to 1.5 m tall, somewhat succulent; sheaths smooth; blades flat, mostly 10 to 20 cm long, 4 to 8 mm wide, usually smooth beneath, slightly scaberulous on the upper surface and margin; panicle 20 to 40 cm long, somewhat open, the branches as much as 10 cm long, several-flowered, often spreading at anthesis; spikelets 1 to 2

cm long, 6- to 12-flowered, the florets rather loosely imbricate; glumes 2 to 3 and 3 to 4 mm long; lemmas green or pale, about 4 mm long, narrowed only slightly at the summit, scaberulous, the paleas usually exceeding them. 2l (*Panicularia septentrionalis* Bickn.)—Shallow water and wet places, Quebec to Minnesota, south to South Carolina and eastern Texas (fig. 132).

FIGURE 131.—*Glyceria septentrionalis*. Panicle, × 1; floret, × 10. (Deam 3184, Ind.)

6. Glyceria flúitans (L.) R. Br. MANNAGRASS. (Fig. 133.) Resembling *G. septentrionalis* in habit; first glume usually only one-third as long as the first lemma; lemmas scaberulous, the nerves distinct but not raised prominently above the tissue of the internerves; tip of palea usually exceeding its lemma. 2l (*Panicularia fluitans* Kuntze; *P. brachyphylla* Nash.)—Shallow water, Newfoundland to Quebec and New York; South Dakota; Eurasia.

FIGURE 133.—*Glyceria fluitans*. Panicle, × 1; floret, × 10. (McIntosh 1076, S.Dak.)

7. Glyceria occidentális (Piper) J. C. Nels. (Fig. 134.) Culms flaccid, 60 to 100 cm tall; blades 3 to 12 mm wide, smooth beneath, somewhat scabrous on the upper surface; panicle loose, spreading at anthesis, 30 to 50 cm long; spikelets, 1.5 to 2 cm long; first glume mostly about 2 mm long; lemmas usually tinged with purple near the tip, 4 to 6 mm long, rather strongly scabrous, 7- to 9-nerved, the nerves prominent, raised above the tissue of the internerves; palea about as long as its lemma, sometimes slightly exceeding it. 2l (*Panicularia occidentalis* Piper.)—Marshes, shallow water, and wet places, Idaho to British Columbia and northern California (fig. 135). The seeds are used for food by the Indians.

FIGURE 132.—Distribution of *Glyceria septentrionalis*.

SECTION 2. HYDRÓPOA Dum.

Spikelets more or less laterally compressed, ovate to oblong, usually not more than 5 mm long; panicles open or condensed but not long and narrow (except in *G. melicaria*).

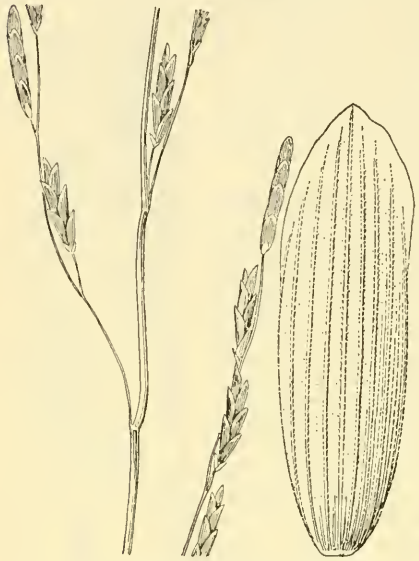

FIGURE 134.—*Glyceria occidentalis.* Panicle, × 1; floret, × 10. (Type.)

8. Glyceria pauciflóra Presl. WEAK MANNAGRASS. (Fig. 136.) Culms 50 to 120 cm tall; sheaths smooth or scaberulous; blades thin, flat, lax, scaberulous, mostly 10 to 15 cm long, 5 to 15 mm wide; panicle open or rather dense, nodding, 10 to 20 cm long,

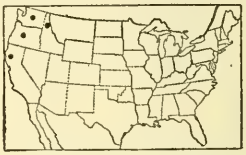

FIGURE 135.—Distribution of *Glyceria occidentalis.*

the branches ascending or spreading, rather flexuous, the spikelets crowded on the upper half, the lowermost usually 2 to 4; spikelets mostly 5- or 6-flowered, 4 to 5 mm long, often purplish; glumes broadly ovate or oval, about 1 and 1.5 mm long, the margins erose-scarious; lemmas oblong, about 2 mm long, with 5 prominent nerves and an outer short faint pair near the margins, scaberulous on the nerves and somewhat so between them, the tip rounded, scarious, somewhat erose. 2↓ (*Panicularia pauciflora* Kuntze.)—Shallow water, marshes and wet meadows, Alaska to South Dakota,

FIGURE 137.—Distribution of *Glyceria pauciflora.*

south to California and New Mexico, rising in the mountains to timber line (fig. 137).

FIGURE 136.—*Glyceria pauciflora.* Panicle, × 1; floret, × 10. (Sandberg, Heller, and McDougal 636, Idaho.)

9. Glyceria erécta Hitchc. (Fig. 138.) Differing from *G. pauciflora* in the smaller size, mostly 30 to 40 cm tall, and in the narrow erect panicles, 3 to 8 cm long, with ascending or appressed few-flowered branches; lemmas about 3 mm long. 2↓ (*Panicularia erecta* Hitchc.)—Springy or boggy places, mostly near or above timber line, Crater Lake, Oreg., to Mount Whitney, Calif., and Glenbrook, Nev. Passes into the preceding species, of which it may be an alpine variety.

10. Glyceria obtúsa (Muhl.) Trin. (Fig. 139.) Culms erect, often decumbent at base, 50 to 100 cm tall, rather firm; blades elongate, erect, mostly smooth, flat or folded, 2 to 6 mm wide; panicle erect, oblong or narrowly elliptic, dense, 5 to 15 cm long, the branches ascending or appressed; spikelets mostly 4- to 7-flowered, 4 to 6 mm long, green or tawny, the rachilla joints very short; glumes broad, scarious, 1.5 and 2 mm long; lemmas firm, faintly nerved, smooth, 3 to 4 mm long, obtuse, the scarious tip narrow, often revolute. 2↓ (*Panicularia obtusa* Kuntze.)—Bogs and marshy places, Nova Scotia to North Carolina, near the coast (fig. 140).

FIGURE 138.—*Glyceria erecta*. Panicle, × 1; floret, × 10. (Hitchcock 3059, Oreg.)

11. Glyceria melicária (Michx.) F. T. Hubb. (Fig. 141.) Culms slender, solitary or few, 60 to 100 cm tall; blades elongate, scaberulous, 2 to 5 mm wide; panicle narrow but rather loose, nodding, 15 to 25 cm long, the branches erect, rather distant; spikelets 3- or 4-flowered, about 4 mm long, green; glumes about 1.5 and 2 mm long, acutish; lemmas firm, 2 to 2.5 mm long, acutish, smooth, the nerves rather faint. 2↓ (*G. torreyana* Hitchc.; *Panicularia torreyana* Merr.; *P. melicaria* Hitchc.)—Swamps and wet woods, New Brunswick to Ohio, south to the mountains of North Carolina (fig. 142).

FIGURE 139.—*Glyceria obtusa*. Panicle, × 1; 2 views of floret, × 10. (Miller, N.Y.)

12. Glyceria canadénsis (Michx.) Trin. RATTLESNAKE MANNAGRASS. (Fig. 143.) Culms erect, solitary or few in a tuft, 60 to 150 cm tall; blades scabrous, 3 to 7 mm wide; panicle open, 15 to 20 cm long, nearly as wide, the branches rather distant, drooping, naked below; spikelets ovate or oblong, 5- to 10-flowered, 5 to 6 mm long, the florets crowded, spreading; glumes about 2 and 3 mm long; lemmas 3 to 4 mm long, the 7 nerves obscured in the firm tissue of the lemma; palea bowed out on the keels, the floret somewhat tumid. 2↓ (*Panicularia canadensis* Kuntze.)—Bogs and wet places, Newfoundland to Minnesota, south to Maryland and Illinois (fig. 144).

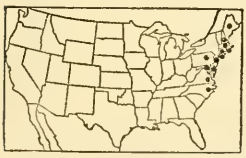

FIGURE 140.—Distribution of *Glyceria obtusa*.

GLYCERIA CANADENSIS var. LÁXA (Scribn.) Hitchc. On the average taller, with looser panicles of somewhat smaller 3- to 5-flowered spikelets. 2↓ (*Panicularia laxa* Scribn.)—Wet places, Nova Scotia to New York, Maryland, and West Virginia; Michigan.

13. Glyceria striáta (Lam.) Hitchc. FOWL MANNAGRASS. (Fig. 145.) Plants in large tussocks, pale green; culms erect, slender, rather firm, 30 to 100 cm tall, sometimes taller; blades erect or ascending, flat or folded, moderately firm, usually 2 to 6 mm wide, sometimes to 9 mm; panicle ovoid, open, 10 to 20 cm long, nodding, the branches ascending at base, drooping, naked below; spikelets ovate or oblong, 3- to 7-flowered, 3 to 4 mm long, often purplish, somewhat crowded toward the ends of the branchlets; glumes about 0.5 and 1 mm long, ovate, obtuse; lemmas oblong, prominently 7-nerved, about 2 mm long, the scarious tip inconspicuous; palea rather firm, about as long as the lemma, the smooth keels prominent, bowed out. 2↓ (*G. nervata* Trin.; *Panicularia nervata* Kuntze.)—Moist meadows and wet places, Newfoundland to British Columbia, south to northern Florida, Texas, Arizona, and northern California. A low strict northern form has been called *G. striata* var. *stricta* Fernald (*G. nervata* var. *stricta* Scribn.)

FIGURE 141.—*Glyceria melicaria*. Panicle, × 1; 2 views of floret, × 10. (Harvey 1322, Maine.)

FIGURE 142.—Distribution of *Glyceria melicaria*.

14. Glyceria eláta (Nash) Hitchc. TALL MANNAGRASS. (Fig. 146.) Resembling *G. striata;* plants dark green; culms 1 to 2 m tall, rather succulent; blades flat, thin, lax, 6 to 12 mm wide; panicle oblong, 15 to 30 cm long,

FIGURE 143.—*Glyceria canadensis*. Panicle, × 1; floret, × 10. (Kneucker, Gram. 464, Conn.)

FIGURE 144.—Distribution of *Glyceria canadensis*.

FIGURE 145.—*Glyceria striata*. Plant, × ½; spikelet, × 5; floret, × 10. (V. H. Chase 60, Ill.)

the branches spreading, the lower often reflexed; spikelets 6- to 8-flowered, 3 to 5 mm long; glumes and lemmas a little longer than in *G. striata*. 2↓ (*Panicularia elata* Nash; *P. nervata elata* Piper.)—Wet meadows, springs, and shady moist woods, Montana to British Columbia, south in the mountains to New Mexico and southern California.

FIGURE 146.—*Glyceria elata*. Plant, × 1; floret, × 10. (Hitchcock 2731, Calif.)

15. Glyceria otísii Hitchc. (Fig. 147.) Resembling *G. elata;* spikelets broader, oblong, with on the average more florets, the glumes broader; lemmas broader, especially at the summit, very scabrous, the prominent hyaline tip contrasting with the purple zone just below, the lower part of the lemma green. 2↓ —Timber, Jefferson County, Wash. Known only from the type collection.

16. Glyceria grándis S. Wats. AMERICAN MANNA-GRASS. (Fig. 148.) Culms tufted, stout, 1 to 1.5 m tall; blades flat, 6 to 12 mm wide; panicle large, very compound, 20 to 40

FIGURE 147.—*Glyceria otisii*. Panicle, × 1; floret, × 10. (Type.)

cm long, open, nodding at summit; spikelets 4- to 7-flowered, 5 to 6 mm long, glumes whitish, about 1.5 and 2 mm long; lemmas purplish,

about 2.5 mm long; palea rather thin, about as long as the lemma. 2l (*Panicularia americana* MacM.)—Banks of streams, marshes, and

FIGURE 148.—*Glyceria grandis*. Panicle, × 1; floret, × 10. (Pearce, N.Y.)

FIGURE 149.—Distribution of *Glyceria grandis*.

wet places, Prince Edward Island to Alaska, south to Tennessee, Ohio, Iowa, Nebraska, New Mexico, and eastern Oregon (fig. 149).

Glyceria nubigena W. A. Anderson. Similar to *G. grandis;* culms more slender and less succulent; spikelets 3- to 5-flowered; glumes purplish, not pale and translucent as in *G. grandis;* lemmas on the average longer and

FIGURE 150.—*Glyceria pallida*. Plant, × 1; floret, × 10. (Pearce, N.Y.)

wider, the nerves farther apart and less prominent; palea firmer, rather coriaceous. 2l —Boggy openings in forest, Clingmans

Dome, Great Smoky Mountains, Tenn. A rare and apparently distinct species based upon fragmentary material. More specimens are needed.

FIGURE 151.—Distribution of *Glyceria pallida.*

17. Glyceria pállida (Torr.) Trin. (Fig. 150.) Culms slender, lax, ascending from a decumbent rooting base, 30 to 100 cm long; blades mostly 4 to 8 mm wide; panicle pale green, open, 5 to 15 cm long, the branches ascending, flexuous, finally more or less spreading; spikelets somewhat elliptic, 4- to 7-flowered, 6 to 7 mm long; glumes 1.5 to 2 and 2 to 2.5 mm long; lemmas 2.5 to 3 mm long, scaberulous, obtuse, the scarious tip erose; anthers linear, about 1 mm long. 2↓ (*Panicularia pallida* Kuntze.)—Shallow cold water, Maine to Wisconsin, south to North Carolina and Missouri (fig. 151). Resembles species of *Poa.*

18. Glyceria neogaéa Steud. (Fig. 152.) Resembling *G. pallida* and appearing to grade into it; culm more slender, 20 to 40 cm long; blades 1 to 3 mm wide; panicle on the average smaller, the branches finally spreading or reflexed; spikelets mostly 3- to 5-flowered, 4 to 5 mm long; glumes and lemmas a little shorter than in *G. pallida;* anthers globose, 0.2 to 0.5 mm long. 2↓ (*G. fernaldii* St. John.)—Shallow water, Newfoundland to Minnesota, south to Connecticut (fig. 153).

FIGURE 152.—*Glyceria neogaea.* Plant, × 1; floret, × 10. (Collins, Fernald, and Pease, Que.)

7. SCLERÓCHLOA Beauv.

Spikelets 3-flowered, the upper floret sterile; rachilla continuous, broad, thick, the spikelet falling entire; glumes broad, obtuse, rather firm, with hyaline margins, the first 3-nerved, the second 7-nerved; lemmas rounded on the back, obtuse with 5 prominent parallel nerves and hyaline margins; palea hyaline, sharply keeled. Low tufted annual, with broad upper sheaths, folded blades with boat-shaped tips, and dense spikelike racemes, the spikelets subsessile, imbricate in two rows on one side of the broad thick rachis. Type species, *Sclerochloa dura.* Name from Greek *skleros,* hard, and *chloa,* grass, alluding to the firm glumes.

FIGURE 153.—Distribution of *Glyceria neogaea.*

1. Sclerochloa dúra (L.) Beauv. (Fig. 154.) Culms erect to spreading, 2 to 7 cm long; foliage glabrous, the lower leaves very small, the upper increasingly larger, with broad overlapping sheaths; blades 7 to 18 mm long, 1 to 3 mm wide, the upper exceeding the raceme, the junction with the sheath obscure; raceme 1 to 2 cm long, nearly half as wide; spikelets 6 to 7

mm long on very short thick pedicels; first glume about one-third, the second half as long as the spikelets; lower lemma 5 mm long.

FIGURE 154.—*Sclerochloa dura.* Plant, × 1; spikelet and floret, × 10. (Type.)

⊙ —Dry sandy or gravelly soil, Washington, Idaho, Colorado, and Utah (fig. 155); introduced from southern Europe.

8. FLUMÍNEA Fries

(*Scolochloa* Link)

Spikelets 3- or 4-flowered, the rachilla disarticulating above the glumes and between the florets; glumes nearly equal, somewhat scarious and lacerate at summit, the first 3-nerved, the second 5-nerved, about as long as the first lemma; lemmas firm, rounded on the back, villous on the callus, 7-nerved, the nerves rather faint, unequal, extending into a scarious lacerate apex; palea narrow, flat, about as long as the lemma. Tall perennials, with succulent rhizomes, flat blades, and spreading panicles. Type species, *Fluminea festucacea.* Name from Latin *flumen*, a river, the grass commonly growing along river margins.

FIGURE 155.—Distribution of *Sclerochloa dura.*

The single species has some value for forage and is often a constituent of marsh hay.

1. Fluminea festucácea (Willd.) Hitchc. (Fig. 156.) Culms erect, stout, 1 to 1.5 m tall, from extensively creeping, succulent rhizomes; blades elongate, scabrous on the upper surface, mostly 5 to

FIGURE 156.—*Fluminea festucacea.* Plant, × ½; spikelet and floret, × 5. (Griffiths 870, S.Dak.)

10 mm wide, extending into a fine point; panicle 15 to 20 cm long, loose, the distant branches fascicled, ascending, naked below, the lowermost nearly as long as the panicle; spikelets about 8 mm long, the florets approximate; lemmas about 6 mm long. ♃ —Shallow water and marshes, Manitoba to British Columbia, south to northern Iowa, Nebraska, and eastern Oregon (fig. 157); northern Eurasia.

9. PLEUROPÓGON R. Br. Semaphore-grass

Spikelets several- to many-flowered, linear, the rachilla disarticulating above the glumes and between the florets; glumes unequal, membranaceous or subhyaline, scarious at the somewhat lacerate tip, the first 1-nerved, the second obscurely 3-nerved; lemmas membranaceous, 7-nerved, with a round indurate callus, the apex entire or 2-toothed, the midnerve extending into a short mucro or into an awn; keels of the palea winged on the lower half. Soft annuals or perennials, with simple culms, flat blades, and loose racemes of rather large spikelets on a slender flexuous axis. Type species, *Pleuropogon sabinii* R. Br. Name from Greek *pleura*, side, and *pogon*, beard, the palea of the type species having a bristle on each side at the base.

Figure 157.—Distribution of *Fluminea festucacea*.

Palatable grasses, but too infrequent to be of economic value.

Lemmas about 6 mm long; plants annual; spikelets ascending.
1. P. californicus.
Lemmas about 8 mm long; plants perennial; spikelets finally reflexed or drooping.
2. P. refractus.

1. Pleuropogon californicus (Nees) Benth. (Fig. 158.) Annual; culms tufted, erect or decumbent at base, 30 to 60 cm tall; blades flat or folded, seldom more than 10 cm long, 2 to 5 mm wide; raceme 10 to 15 cm long, with 5 to 10 rather distant short-pediceled spikelets; spikelets 6- to 12-flowered, mostly about 2.5 cm long, erect, or somewhat spreading; glumes obtuse, erose, 4 to 6 mm long; lemmas scabrous, 5 to 6 mm long, the nerves prominent, the tip obtuse, scarious, erose, the awn usually 6 to 12 mm long; wings of palea prominent, cleft, forming a tooth about the middle. ☉ —Wet meadows and marshy ground, Mendocino County to the San Francisco Bay region, Calif.

2. Pleuropogon refractus (A. Gray) Benth. Nodding semaphore-grass. (Fig. 159.) Perennial; culms 1 to 1.5 m tall; blades elongate, the uppermost nearly obsolete, 3 to 7 mm wide; raceme about as in *P. californicus*, the spikelets as many as 12, about 3 cm long, finally reflexed or drooping; lemmas about 8 mm long, less scabrous and the nerves less prominent than in *P. californicus;* awn from 12 mm long to nearly obsolete; palea narrow, keeled to about the middle, scarcely or minutely toothed. ♃ —Bogs, wet meadows, and mountain streams, Washington to Mendocino County, Calif., west of the Cascades.

FIGURE 158.—*Pleuropogon californicus.* Plant, × ½; spikelet, × 3; floret, × 5. (Bolander 6075, Calif.)

10. PÓA L. Bluegrass

Spikelets 2- to several-flowered, the rachilla disarticulating above the glumes and between the florets, the uppermost floret reduced or rudimentary; glumes acute, keeled, somewhat unequal, the first usually 1-nerved, the second usually 3-nerved; lemmas somewhat keeled, acute or acutish, rarely obtuse, awnless, membranaceous, often somewhat scarious at the summit, 5-nerved (intermediate nerves, that is, the pair between the keel and the marginal nerves, rarely obsolete), the nerves sometimes pubescent. Low or rather tall slender annuals or usually perennials with spikelets in open or contracted panicles, the relatively narrow blades flat, folded, or involute, ending in a boat-shaped tip. Standard species, *Poa pratensis*. Name from Greek, *poa*, grass.

Figure 159.—*Pleuropogon refractus*. Plant, ×1; floret, × 5. (Sandberg and Leiberg 734, Wash.)

There are several groups of *Poa* that present many taxonomic difficulties. In the groups containing, for example, *P. nervosa*, *P. arctica*, *P. scabrella*, and *P. nevadensis*, many species have been proposed which are not here recognized as valid, because they were based upon trivial or variable characters. The keys are based upon average specimens but the student may find occasional intermediates between the valid species.

The bluegrasses are of great importance because of their forage value, some species being cultivated for pasture and others forming a large part of the forage on the mountain meadows of the West. The most important is *Poa pratensis*, commonly known as bluegrass or Kentucky bluegrass. In the cooler parts of the United States it is cultivated for lawns and is the standard pasture grass in the humid regions where the soil contains plenty of lime. It has been extensively used in the improvement of badly depleted western mountain ranges. *P. compressa*, Canada bluegrass, is cultivated for pasture in the Northeastern States and Canada, especially on poor soils. *P. trivialis* and *P. palustris*, are occasionally grown in meadow mixtures but are of little agricultural importance. *P. arachnifera*, Texas bluegrass, has been used in some parts of the South for winter pasture and as a lawn grass. *P. annua* is a common weed in lawns and gardens. *P. bulbosa* is cultivated about Medford, Oreg., and elsewhere.

With very few exceptions the bluegrasses are palatable and nutritious and are often the most important grasses in many parts of the West. At high altitudes, *P. alpina*, *P. arctica*, *P. epilis* and *P. rupicola* are important. In the mountains mostly below timber line are found *P. fendleriana* (mutton grass), *P. longiligula*, *P. nervosa*, *P. secunda* (Sandberg bluegrass), *P. canbyi*, and *P. juncifolia*, all of wide distribution. *P. interior* is mostly in the Rocky Mountains; *P. scabrella*

is probably the most important forage grass of the lower elevations in California; *P. gracillima* and *P. ampla* are mostly in the Northwestern States; *P. arida* is the most valuable bluegrass of the Plains. *P. bigelovii*, an annual, is important in the Southwestern States. *P. macrantha* and *P. confinis* are native sandbinders of the sand dunes on the coast of Washington and Oregon, but are not cultivated.

Spikelets little compressed, narrow, much longer than wide, the lemmas convex on the back, the keels obscure, the marginal and intermediate nerves usually faint. All bunchgrasses.
Lemmas crisp-puberulent on the back toward the base (the pubescence sometimes obscure or only at the very base)---------- 6. SCABRELLAE.
Lemmas glabrous or minutely scabrous, but not crisp-puberulent. 7. NEVADENSES.
Spikelets distinctly compressed, the glumes and lemmas keeled.
Plants annual---------- 1. ANNUAE.
Plants perennial.
Creeping rhizomes present---------- 2. PRATENSES.
Creeping rhizomes wanting.
Lemmas webbed at base---------- 3. PALUSTRES.
Lemmas not webbed at base (sometimes sparsely webbed in *P. laxa* and *P. pattersoni*).
Lemmas pubescent on the keel or marginal nerves or both, sometimes pubescent also on the internerves---------- 4. ALPINAE.
Lemmas glabrous (minutely pubescent at base in *P. unilateralis*). 5. EPILES.

1. Annuae

Lemmas glabrous, except the scabrous keel, webbed at base. Sheaths glabrous. 1. P. BOLANDERI.
Lemmas pubescent.
Lemmas pubescent on the back especially toward the base, but not distinctly villous on the keel and nerves, slightly webbed at base. Sheaths usually scabrous; panicle open---------- 2. P. HOWELLII.
Lemmas pubescent on the nerves, sometimes also on the internerves.
Panicle narrow, contracted, usually interrupted; sheaths scabrous. Lemmas webbed, pubescent on the internerves below---------- 3. P. BIGELOVII.
Panicle oblong or pyramidal, the branches spreading; sheaths glabrous.
Lemmas with webby hairs at base, distinctly 3-nerved, the intermediate nerves obscure; anthers 0.1 to 0.2 mm long--- 4. P. CHAPMANIANA.
Lemmas not webbed at base, distinctly 5-nerved; anthers 0.5 to1 mm long. 5. P. ANNUA.

2. Pratenses

1a. Culms strongly flattened, 2-edged---------- 6. P. COMPRESSA.
1b. Culms terete or slightly flattened, not 2-edged.
2a. Plants dioecious.
Panicle oblong, the two sexes unlike in appearance, the pistillate spikelets woolly, the staminate glabrous or nearly so. Plains of Texas. 7. P. ARACHNIFERA.
Panicle oblong or ovoid, the two sexes similar. Seacoast, California and northward.
Glumes and lemmas about 8 mm long---------- 8. P. MACRANTHA.
Glumes and lemmas not more than 6 mm long.
Panicle densely ovoid; lemmas 6 mm long, slightly villous below. 9. P. DOUGLASII.
Panicle somewhat open; lemmas 3 mm long, scaberulous. 10. P. CONFINIS.
2b. Plants not dioecious, the florets perfect.
3a. Blades involute. Glumes and lemmas 4 to 5 mm long. 11. P. RHIZOMATA.
3b. Blades flat or folded.
4a. Lemmas not pubescent nor webbed.
Panicle almost spikelike, erect; glumes 2 mm long. 12. P. ATROPURPUREA.

Panicle open, nodding; glumes 3 to 4 mm long.
Blades broad and short; lower panicle branches reflexed.
13. P. CURTA.
Blades elongate; panicle branches ascending..... 14. P. NERVOSA.
4b. Lemmas pubescent.
5a. Lemmas glabrous except for the web at the base.
15. P. KELLOGGII.
5b. Lemmas pubescent on the nerves or back, sometimes also webbed at base.
6a. Internerves glabrous, the keel and marginal nerves pubescent.
Lower sheaths retrorsely pubescent, purplish; lemmas pubescent on keel and marginal nerves, not webbed. 14. P. NERVOSA.
Lower sheaths glabrous (scaberulous in *P. laxiflora*); lemmas webbed at base.
Culms retrorsely scabrous..... 16. P. LAXIFLORA.
Culms glabrous.
Lower panicle branches in a whorl of usually five; blades mostly shorter than the culm..... 17. P. PRATENSIS.
Lower panicle branches usually in twos, spreading, spikelet-bearing near the ends; blades about as long as the culm.
18. P. CUSPIDATA.
6b. Internerves pubescent near base, the keel and marginal nerves pubescent.
Panicle contracted, the branches appressed; blades folded, firm and stiff. Plains and alkali meadows at medium altitudes.
19. P. ARIDA.
Panicle open, the branches spreading.
Plants mostly more than 50 cm tall; panicle narrow, 10 to 20 cm long, the lower branches mostly in threes.
20. P. GLAUCIFOLIA.
Plants mostly less than 50 cm tall; panicle pyramidal, 5 to 10 cm long, the lower branches mostly in twos. Alpine meadows.
21. P. ARCTICA.

3. Palustres

1a. Lemmas glabrous, or the keel sometimes pubescent.
Sheaths retrorsely scabrous. Culms decumbent and often rooting at base; keel of lemma glabrous or slightly pubescent..... 22. P. TRIVIALIS.
Sheaths glabrous.
Panicle narrow, drooping, the branches appressed or ascending.
23. P. MARCIDA.
Panicle very open, the few branches slender, naked below, spreading or drooping.
Lemmas villous on the keel; panicle branches mostly in fours or fives.
24. P. ALSODES.
Lemmas glabrous on the keel; panicle branches mostly in twos or threes.
Lemmas obtuse..... 25. P. LANGUIDA.
Lemmas acute..... 26. P. SALTUENSIS.
1b. Lemmas pubescent on keel and marginal nerves.
2a. Sheaths distinctly retrorse-scabrous (sometimes faintly so). Culms usually stout, 40 to 120 cm tall; panicle usually large and open, mostly more than 15 cm long..... 27. P. OCCIDENTALIS.
2b. Sheaths glabrous or faintly scaberulous.
3a. Lower panicle branches distinctly reflexed at maturity.
Panicle oblong, erect, mostly more than 15 cm long, the branches several (usually more than 3) in a whorl..... 29. P. SYLVESTRIS.
Panicle nodding, mostly less than 15 cm long, the branches 1 to 3 together.
30. P. REFLEXA.
3b. Lower panicle branches not reflexed.
4a. Panicle narrowly pyramidal, erect, 15 to 20 cm long. Lemmas 4 mm long, pubescent on nerves and internerves; webbed at base; New Mexico..... 28. P. TRACYI.
4b. Panicle broadly pyramidal, usually nodding.
5a. Intermediate nerves of lemma distinct..... 31. P. WOLFII.
5b. Intermediate nerves of lemma obscure.
6a. Lower panicle branches in pairs, elongate, capillary, bearing a few spikelets near the ends.

Spikelets rather broad, the rachilla joints short, hidden by the florets; sheaths smooth; culms in dense tufts; alpine rocky slopes---- 32. P. PAUCISPICULA.
Spikelets narrow, the rachilla joints slender, somewhat elongate, usually not hidden by the florets; sheaths minutely roughened; culms solitary or in small tufts; shady bogs.
Intermediate nerves of lemma distinct; uppermost ligule acute, 3 to 4 mm long; western mountains below timber line. 33. P. LEPTOCOMA.
Intermediate nerves of lemma obscure; uppermost ligule truncate, 0.3 to 1.5 mm long; Great Lake region at low altitudes. 34. P. PALUDIGENA.

6b. Lower panicle branches often more than 2, if only 2 not capillary and elongate.
Florets usually converted into bulblets with dark purple base; culms swollen and bulblike at base.---- 35. P. BULBOSA.
Florets normal; culms not bulblike at base.
Glumes narrow, acuminate, about as long as the first lemma; ligule very short---- 36. P. NEMORALIS.
Glumes lanceolate, acute, shorter than the first lemma; ligules rather prominent, those of the culm leaves 1 to 3 mm or more long.
Spikelets about 6 mm long; lemmas 4 mm long. 37. P. MACROCLADA.
Spikelets about 4 mm long; lemmas 2.5 to 3 mm long.
Culms decumbent at the purplish base; panicle 10 to 30 cm long, large and open---- 38. P. PALUSTRIS.
Culms erect from a green or tawny base; panicle mostly less than 10 cm long, comparatively small and few-flowered. 39. P. INTERIOR.

4. Alpinae

Blades folded or involute, firm, rather stiff.
Ligule very short, not noticeable when viewed from the side of sheath. 40. P. FENDLERIANA.
Ligule prominent, easily seen in side view, 5 to 7 mm long. 41. P. LONGILIGULA.
Blades flat or, if involute, rather lax or soft.
Panicle branches slender, spreading or drooping, the lower naked and simple for 3 to 4 cm or more---- 42. P. AUTUMNALIS.
Panicle branches not long and spreading.
Panicle broadly pyramidal, condensed, about as broad as long, the lower branches spreading or reflexed. Spikelets broad, subcordate. 43. P. ALPINA.
Panicle longer than broad.
Panicle nodding, the lower branches slender, arcuate-drooping. 44. P. STENANTHA.
Panicle erect, the lower branches short.
Panicle rather loose, lower branches naked below, ascending (see also *P. macroclada*).
Plants glaucous, culms stiffly erect---- 45. P. GLAUCA.
Plants not glaucous; culms rather lax---- 46. P. LAXA.
Panicle narrow, condensed, the branches short (see also *P. unilateralis*).
Culms rather lax, not much longer than the numerous basal leaves. 47. P. PATTERSONI.
Culms stiff, much longer than the basal leaves-- 48. P. RUPICOLA.

5. Epiles

Panicle open, 10 to 15 cm long. Blades involute, slender---- 49. P. INVOLUTA.
Panicle contracted, or if open less than 10 cm long.
Blades scabrous, filiform---- 50. P. CUSICKII.
Blades glabrous.
Lemmas minutely pubescent at base---- 51. P. UNILATERALIS.
Lemmas glabrous.
Blades of the culm 2 to 3 mm wide, flat, those of the innovations slender or filiform---- 52. P. EPILIS.

Blades of the culm and innovations similar. Panicle few-flowered.
Panicle short, open, the capillary branches bearing 1 or 2 spikelets. Culms 10 to 20 cm tall---- 53. P. VASEYOCHLOA.
Panicle narrow.
Lemmas 5 to 6 mm long; panicle usually pale or silvery. 54. P. PRINGLEI.
Lemmas less than 4 mm long; panicle usually purple.
Glumes about as long as the first and second florets; panicle mostly not exceeding the short soft blades---- 55. P. LETTERMANI.
Glumes shorter than the first floret; panicle usually much longer than the usually stiff blades---- 56. P. LEIBERGII.

6. Scabrellae

Sheaths somewhat scabrous---- 57. P. SCABRELLA.
Sheaths glabrous.
Panicle rather open, the lower branches naked at base, ascending or somewhat spreading; culms usually decumbent at base---- 58. P. GRACILLIMA.
Panicle contracted, the branches appressed or at anthesis somewhat divergent.
Culms slender, on the average less than 30 cm tall; numerous short innovations at base. Blades usually folded---- 59. P. SECUNDA.
Culms stouter, on the average more than 50 cm tall; innovations usually not numerous---- 60. P. CANBYI.

7. Nevadenses

Sheaths scaberulous. Ligule long, decurrent---- 61. P. NEVADENSIS.
Sheaths glabrous.
Ligule prominent; blades broad and short---- 62. P. CURTIFOLIA.
Ligule short; blades elongate.
Blades involute---- 63. P. JUNCIFOLIA.
Blades flat---- 64. P. AMPLA.

1. **Ánnuae.**—Annuals; culms seldom more than 50 cm tall; panicles open (contracted in *P. bigelovii*).

1. Poa bolandéri Vasey. (Fig. 160.) Culms erect, 15 to 60 cm tall; sheaths glabrous; blades relatively short, 3 to 5 mm wide, abruptly narrowed at tip; panicle about half the length of the entire plant, at first contracted, finally open, the branches few, distant, glabrous, stiffly spreading, naked below; spikelets usually 2- or 3-flowered, the internodes of the rachilla long; glumes broad, 2 and 3 mm long; lemma scantily webbed at base, acute, the marginal nerves rather indistinct, the intermediate nerves obsolete. ⊙ —Open ground or open woods, 1,500 to 3,000 m, Washington and Idaho to western Nevada and the southern Sierras in California (fig. 161).

2. Poa howéllii Vasey and Scribn. HOWELL BLUEGRASS. (Fig. 162.) Culms 30 to 60 cm tall; sheaths retrorsely scabrous to glabrous; blades narrower than in *P. bolanderi*, gradually acuminate; panicle one third to half the entire height of the plant, open, the branches in rather distant fascicles, spreading, scabrous, naked below, some short branches intermixed; spikelets 3 to 5 mm long, usually 3- or 4-flowered; glumes narrow, acuminate, 1.5 and 2 mm long; lemmas webbed at base, 2 to 3 mm long, ovate-lanceolate, pubescent on the lower part, the nerves all rather distinct. ⊙ —Rocky banks and shaded slopes, mostly less than 1,000 m, Vancouver Island to southern California, especially in the Coast Ranges.

3. Poa bigelóvii Vasey and Scribn. BIGELOW BLUEGRASS. (Fig. 163.) Culms erect, 15 to 35 cm tall; blades 1 to 5 mm wide; panicle narrow, interrupted, 7 to 15 cm long, the branches short, appressed; spikelets about 6 mm long; glumes acuminate, 4 mm long, 3-nerved; lemmas about 3 mm long, sometimes 4 mm, webbed at base, conspicu-

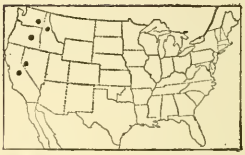

FIGURE 161.—Distribution of *Poa bolandéri.*

FIGURE 160.—*Poa bolanderi.* Panicle, × 1; floret, × 10. (Swallen 799, Calif.)

FIGURE 162.—*Poa howellii.* Panicle, × 1; floret, × 10. (Suksdorf 10464, Wash.)

ously pubescent on the lower part of keel and lateral nerves, sometimes sparsely pubescent on lower part of internerves. ⊙ —Open ground, at medium altitudes, Oklahoma and western Texas to Colorado, Nevada, and southern California; northern Mexico (fig. 164).

4. Poa chapmaniána Scribn. (Fig. 165.) Plant drying pale or tawny; culms densely tufted, slender, 10 to 30 cm tall; blades 1 to 1.5 mm wide; panicle oblong-pyramidal, 3 to 8 cm long, open, the lower branches spreading; spikelets 3 to 4 mm long, mostly 3- to 5-flowered; glumes 2 and 2.5 mm long; lemmas about 2 mm long, webbed at base, strongly pubescent on the keel and lateral nerves, the intermediate nerves obscure; anthers 0.1 to 0.2 mm long. ⊙ — Open ground and cultivated fields, Delaware to Iowa, south to Georgia and Texas (fig. 166).

FIGURE 163.—*Poa bigelovii*. Panicle, × 1; floret, × 10. (Fendler 931, N.Mex.)

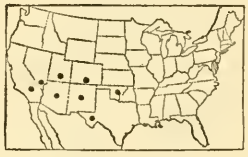

FIGURE 164.—Distribution of *Poa bigelovii*.

FIGURE 165.—*Poa chapmaniana*. Panicle, × 1; floret, × 10. (V. H. Chase 3557, Ill.)

FIGURE 166.—Distribution of *Poa chapmaniana*.

5. Poa ánnua L. ANNUAL BLUEGRASS. (Fig. 167.) Tufted, bright green, erect to spreading, sometimes rooting at the lower nodes, usually 5 to 20 cm tall, sometimes taller, forming mats; culms flattened; blades soft, lax, mostly 1 to 3 mm wide; panicle pyramidal, open, 3 to 7 cm long; spikelets crowded, 3- to 6-flowered, about 4 mm long; first glume 1.5 to 2, the second 2 to 2.5 mm long; lemma not webbed at base, distinctly 5-nerved, more or less pubescent on the lower half of all the nerves, the long hairs on the lower part of the keel sometimes simulating a web; anthers 0.5 to 1 mm long. ⊙ —Open ground, lawns, pastures, waste places, and openings in woods, Newfoundland and Labrador to Alaska, south to Florida and California; tropical America at high altitudes; introduced from Europe. In warmer parts of the United States the species thrives in the winter; in intermediate latitudes it is a troublesome weed in lawns, growing luxuriantly in spring, drying in early summer and leaving unsightly patches.

2. Praténses.—Perennials with slender creeping rhizomes. Several species dioecious.

6. Poa compréssa L. CANADA BLUEGRASS. (Fig. 168.) Culms solitary or few together, often gregarious, strongly flattened, wiry, decumbent at base, bluish green, 15 to 50 cm tall; blades rather short, mostly 1 to 4 mm wide; panicle narrow, 3 to 7 cm long, the usually short branches in pairs, spikelet-bearing to the base; spikelets crowded, subsessile, 3- to 6-flowered, 4 to 6 mm long; glumes 2 to 3 mm long; lemmas firm, 2 to 3 mm long, the web at base scant or wanting, the keel and marginal nerves slightly pubescent toward base, the intermediate nerves obscure. 2l —Open ground, open woods, meadows, and waste places, Newfoundland to Alaska, south to Georgia, Tennessee, Alabama, Oklahoma, New Mexico, and California; introduced from Europe. Cultivated for pastures in poor soil.

FIGURE 167.—*Poa annua.* Panicle, × 1; floret, × 10. (Hitchcock, D.C.)

7. Poa arachnífera Torr. TEXAS BLUEGRASS. (Fig. 169.) Plants dioecious; culms tufted, 30 to 50 cm tall; blades mostly 2 to 4 mm wide, scabrous above; panicle narrow, compact, more or less lobed or interrupted, 5 to 12 cm long; spikelets mostly 5- to 10-flowered, the pistillate conspicuously cobwebby, the lemmas 5 to 6 mm long, acuminate, copiously long webby at base, the strongly compressed keel and lateral nerves ciliate-fringed along the lower half; staminate lemmas glabrous or with a scant web at base. 2l —Prairies and plains, southern Kansas to Texas and Arkansas; introduced eastward to South Carolina and Florida; Idaho (fig. 170). Sometimes cultivated for winter pasture.

8. Poa macrántha Vasey. (Fig. 171.) Plants dioecious; culms erect from a decumbent base, with extensively creeping rhizomes, and also long runners creeping over the sand, 15 to 40 cm tall; sheaths tawny, papery; blades involute, subflexuous; panicle contracted, sometimes dense and spikelike, 5 to 12 cm long, pale or tawny; spikelets about 12 mm long, about 5-flowered; glumes 3-nerved, or the second indistinctly 5-nerved, about 8 mm long; lemmas about 8 mm long, short-webbed at base, pubescent on the keel and marginal nerves below, slightly scabrous on the keel above; pistillate florets with abortive stamens. 2l —Sand dunes along the coast, Washington to northern California.

FIGURE 168.—*Poa compressa.* Panicle, × 1; floret, × 10. (Gayle 750, Maine.)

9. Poa douglásii Nees. (Fig. 172.) Plants dioecious, the two kinds similar; culms ascending from a decumbent base, usually less than 30 cm tall; rhizomes slender; sheaths glabrous, tawny and papery; blades involute, some of them usually exceeding the culm; panicle

ovoid, dense, spikelike, 2 to 5 cm long, 1 to 2 cm wide, pale or purplish; spikelets 6 to 10 mm long, about 5-flowered; glumes broad,

FIGURE 169.—*Poa arachnifera.* Plant and pistillate (♀) and staminate (♂) panicles, × 1; pistillate (♀) and staminate (♂) florets, × 10. (Blackman, Tex.)

3-nerved, 4 to 6 mm long; lemmas 6 to 7 mm long, slightly webbed at base, pubescent on the lower part of the keel and marginal nerves, scabrous on the upper part of the keel, usually with 1 to 3 pairs of intermediate nerves. 2↓—Sand dunes near the coast, California, Point Arena to Monterey.

FIGURE 170.—Distribution of *Poa arachnifera.*

10. Poa confínis Vasey. (Fig. 173.) Plants dioecious, the two kinds similar; culms often geniculate at base, usually less than 15 cm tall, sometimes as much as 30 cm; blades involute, those of the innovations numerous; panicle narrow, 1 to 3 cm long, tawny, the short branches ascending or appressed; spikelets 4 to 5 mm long, mostly 3- or 4-flowered; glumes

unequal, the second 3 mm long; lemmas 3 mm long, scaberulous, sparsely webbed at base, the nerves faint; pistillate florets with minute abortive anthers, the staminate often with rudimentary pistil. 2↓ —Sand dunes and sandy meadows near the coast, British Columbia to Mendocino County, Calif.

11. Poa rhizómata Hitchc. (Fig. 174.) Culms tufted with numerous innovations, 40 to 60 cm tall; lower sheaths usually scaberulous with a puberulent collar; ligule rather prominent on the culm leaves, inconspicuous on the leaves of the innovations; blades involute or sometimes flat, firm, less than 1 mm thick, flexuous, mostly basal, 2 on the culm, usually puberulent on the upper surface; panicle open, 5 to 8 cm long, the lower branches mostly in pairs, 2 to 3 cm long; spikelets,

FIGURE 171.—*Poa macrantha*. Plant, × 1; floret, × 10. (Hitchcock 2822, Oreg.)

FIGURE 172.—*Poa douglasii*. Plant, × 1; floret, × 10. (Bolander 6074, Calif.)

3- to 5-flowered, 6 to 10 mm long; glumes 3 to 5 mm long; lemmas 4 to 5 mm long, with a rather short web at the base, scaberulous at least on the rather distinct nerves, pubescent on the lower part of keel. 2↓ —Dry slopes, southwestern Oregon and northwestern California; apparently rare.

12. Poa atropurpúrea Scribn. (Fig. 175.) Culms erect, 30 to 40 cm tall; blades mostly basal, the uppermost culm leaf below the middle of the culm, folded or involute, firm; panicle contracted, almost spikelike, purple-tinged, 3 to 5 cm long; spikelets 3 to 4 mm long, rather thick; glumes broad, less than 2 mm long; lemmas about

2.5 mm long, broad, glabrous, not webbed at base, the nerves faint. 2l —Known only from Bear Valley, San Bernardino Mountains, Calif.

13. Poa cúrta Rydb. (Fig. 176.) Culms few in a loose tuft, 40 to 80 cm tall, rather lax; sheaths glabrous or minutely roughened; ligule truncate, about 1 mm long; blades 3 to 6 mm wide; panicle open, 5 to 15 cm long, nodding, the rather distant branches spreading or reflexed,

FIGURE 173.—*Poa confinis.* Plant, × 1; floret, × 10. (Piper 4910, Wash.)

FIGURE 174.—*Poa rhizomata.* Plant, × 1; floret, × 10. (Type.)

naked below; spikelets 5 to 10 mm long, 2- to 6-flowered; lemmas lanceolate, subacute, slightly scaberulous, sometimes slightly pubescent on the back at base, without a web, 4 to 5.5 mm long, rather strongly nerved or intermediate nerves faint. 2l —Moist shady places at medium altitudes, western Wyoming, southern Idaho, and Utah.

14. Poa nervósa (Hook.) Vasey. WHEELER BLUEGRASS. (Fig. 177.) Culms erect, 30 to 60 cm tall; sheaths glabrous or the lower

retrorsely pubescent, often purple, the collar often puberulent; ligule 1 to 2 mm long; blades sometimes folded; panicle open, usually 5 to 10 cm long, the apex nodding, the branches mostly in twos or threes, naked below; lemmas rather strongly nerved, glabrous or pubescent on the lower part of the nerves. 2n (*P. wheeleri* Vasey; *P. olneyae* Piper.)—Open woods at medium altitudes, Alberta and British Columbia, south in the mountains to Colorado, New Mexico, and California (fig. 178). Typical *P. nervosa* (including *P. olneyae*), found mostly in Washington and Oregon, has glabrous to scaberulous strongly nerved lemmas and glabrous sheaths, and a loose open panicle, the capillary lower branches in whorls of 3 or 4, drooping, as much as 8 cm long; typical *P. wheeleri*, originally

FIGURE 175.—*Poa atropurpurea*. Plant, × 1; floret, × 10. (Type.)

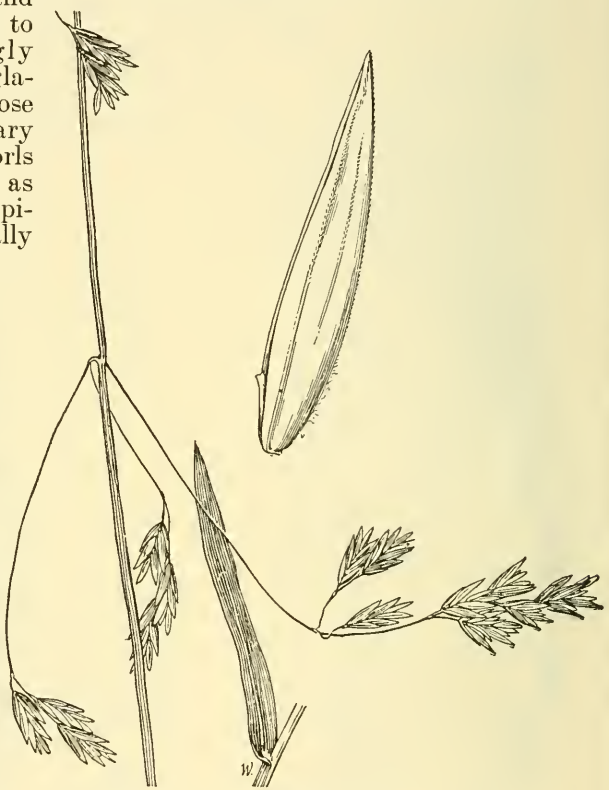

FIGURE 176.—*Poa curta*. Panicle, × 1; floret, × 10. (Jones 5573, Utah.)

described from Colorado, has firmer, less strongly nerved lemmas, more or less pubescent on the lower part of the keel and marginal nerves, and purplish retrorsely pubescent lower sheaths. These characters are not coordinated and the forms grade into each other, both as to characters and range.

15. Poa kellóggii Vasey. (Fig. 179.) Culms 30 to 60 cm tall; sheaths slightly scabrous; blades flat or folded, 2 to 4 mm wide; panicle pyramidal, open, 7 to 15 cm long, the branches mostly solitary or in twos, spreading or reflexed, bearing a few spikelets toward the ends; spikelets rather loosely flowered, 4 to 6 mm long; glumes 3 and 4 mm long; lemmas acute or almost cuspidate, 4 to 5

mm long, glabrous, rather obscurely nerved, conspicuously webbed at base. 2l —Moist woods and shady places, Coast Ranges from

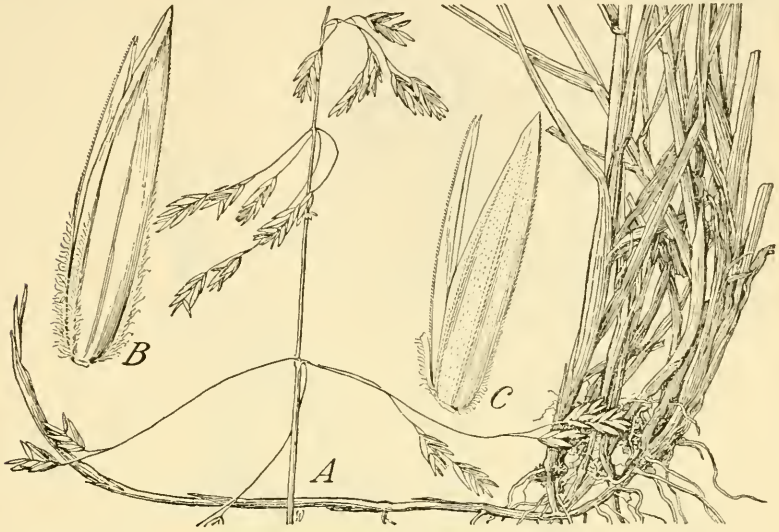

FIGURE 177.—*Poa nervosa*. *A*, Plant, × 1. (Suksdorf 10364, Wash.) *B*, Floret, × 10. (Type of *P. wheeleri*.) *C*, Floret, × 10. (Type of *P. nervosa*.)

FIGURE 178.—Distribution of *Poa nervosa*.

Corvallis, Oreg., to Santa Cruz County, Calif.

16. Poa laxiflóra Buckl. (Fig. 180.) Culms retrorsely scabrous, 100 to 120 cm tall; sheaths slightly retrorse-scabrous; ligule 3 to 5 mm long; blades lax, 2 to 4 mm wide; panicle loose, open, nodding or drooping, 10 to 15 cm long, the lower branches in whorls of 3 or 4; spikelets 3- or 4-flowered,

FIGURE 179.—*Poa kelloggii*. Plant, × 1; floret, × 10. (Kellogg and Bolander 14, Calif.)

5 to 6 mm long; lemmas about 4 mm long, webbed at base, rather sparsely pubescent on lower part of the nerves. 2l —Moist

woods, southeastern Alaska (Cape Fox, Hot Springs), Sol Duc Hot Springs, Olympic Mountains, Wash. Sauvies Island (near Portland), Oreg.

FIGURE 180.—*Poa laxiflora*. Plant, × 1; floret, × 10. (Hitchcock 23468, Wash.)

17. Poa praténsis L. KENTUCKY BLUEGRASS. (Fig. 181.) Culms tufted, erect, slightly compressed, 30 to 100 cm tall; sheaths somewhat keeled; ligule about 2 mm long; blades soft, flat or folded, mostly

FIGURE 181.—*Poa pratensis*. Plant, × ½; spikelet, × 5; floret, × 10. (Williams, S.Dak.)

2 to 4 mm wide, the basal often elongated; panicle pyramidal or oblong-pyramidal, open, the lowermost branches usually in a whorl of 5, ascending or spreading, naked below, normally 1 central long one, 2 shorter lateral ones and 2 short intermediate ones; spikelets crowded, 3- to 5-flowered, 3 to 6 mm long; lemmas copiously webbed at base, silky-pubescent on lower half or two-thirds of the keel and marginal nerves, the intermediate nerves distinct, glabrous. 2l — Open woods, meadows, and open ground, widely distributed throughout the United States and northward, except in arid regions, found in all the States (but not common in the Gulf States) and at all altitudes below alpine regions; introduced from Europe. Bluegrass is commonly cultivated for lawns and pasture in the humid northern parts of the United States.

FIGURE 182.—*Poa cuspidata*. Panicle, × 1; floret, × 10. (Smith 27, Pa.)

FIGURE 183.—Distribution of *Poa cuspidata*.

18. Poa cuspidáta Nutt. (Fig. 182.) Culms in large lax tufts, 30 to 50 cm tall, scarcely longer than the basal blades; blades lax, 2 to 3 mm wide, abruptly cuspidate-pointed; panicle 7 to 12 cm long, open, the branches mostly in pairs, distant, spreading, spikelet-bearing near the ends; spikelets 3- or 4-flowered; lemmas 4 to 6 mm long, tapering to an acute apex, webbed at base, sparingly pubescent on the keel and marginal nerves, the intermediate nerves distinct, glabrous. 2l (*P. brachyphylla* Schult.)—Rocky woods, New Jersey to Ohio, south to Georgia and eastern Tennessee (fig. 183).

FIGURE 185.—Distribution of *Poa arida*.

19. Poa árida Vasey. PLAINS BLUEGRASS. (Fig. 184.) Culms erect, 20 to 50 cm tall; blades mostly basal, firm, folded, usually 2 to 3 mm wide, a single culm leaf usually below the middle of the culm, its blade short; panicle narrow, somewhat contracted, 2 to 10 cm long, the branches appressed or ascending; spikelets rather thick, 5 to 7 mm long, 4- to 8-flowered; lemmas 3 to 4 mm long, densely villous on the keel and marginal nerves and more or less villous on the lower part of the intermediate nerves. 2l (*P. sheldoni* Vasey.)—Prairies, plains, and alkali meadows, up to 3,000 m, Manitoba to Alberta, south to western Iowa, Texas, and northern Arizona (fig. 185).

FIGURE 184.—*Poa arida*. Panicle, × 1; floret, × 10. (Jones, Colo.)

20. Poa glaucifólia Scribn. and Will. (Fig. 186.) Plants glaucous; culms in loose tufts, 60 to 100 cm tall; blades 2 to 3 mm wide; panicle narrow, open, mostly 10 to 20 cm long, the branches usually in somewhat distant whorls, mostly in threes, ascending, very scabrous, naked below; spikelets 2- to 4-flowered; glumes 4 to 5 mm long; lemmas about 4 mm long, villous on the lower half of the keel and marginal nerves and more or less so on the intermediate nerves below. 2l —Moist places, ditches, and open woods at medium altitudes, British Columbia and Alberta through Montana to Nebraska, New Mexico, Arizona, and Nevada (fig. 187).

FIGURE 187.—Distribution of *Poa glaucifolia*.

FIGURE 186.—*Poa glaucifolia*. Panicle, × 1; floret, × 10. (Rydberg 3288, Mont.)

21. Poa árctica R. Br. ARCTIC BLUEGRASS. (Fig. 188.) Culms loosely tufted, erect from a decumbent base, 10 to 30 cm tall; ligule pointed, up to 4 mm long; blades mostly basal, flat or folded, mostly 2 to 3 mm wide, one short blade about the middle of the culm; panicle open, pyramidal, 5 to 10 cm long, the lower branches usually 2, spreading, sometimes reflexed, bearing a few spikelets toward the tip; spikelets 5 to 8 mm long, 3- or 4-flowered; lemmas densely villous on the keel and marginal nerves and pubescent on the lower part of the internerves, the base often webbed. 2l (*P. grayana* Vasey; *P. aperta* Scribn. and Merr., a form with pale, rather lax panicles longer than wide.)—Meadows, mostly above timber line, arctic regions, south to Nova Scotia, in the Rocky Mountains to northern New Mexico, and in the Cascades to Oregon (fig. 189).

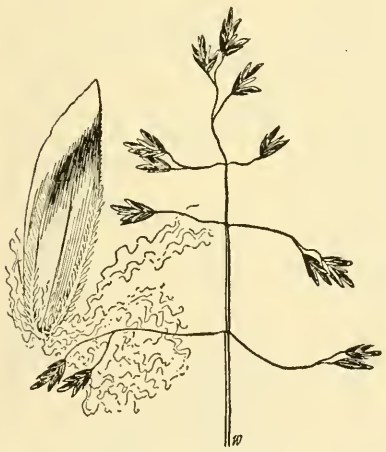

FIGURE 188.—*Poa arctica*. Panicle, × 1; floret, × 10. (Bell 64, Hudson Bay.)

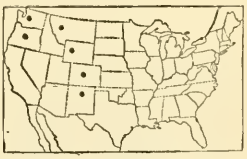

FIGURE 189.—Distribution of *Poa arctica*.

FIGURE 190.—*Poa trivialis* Panicle, × 1; floret, × 10. (Coville, N.Y.)

3. Palústres.—Perennials without creeping rhizomes; lemmas webbed at base, glabrous, or pubescent on the nerves.

22. Poa triviális L. ROUGH BLUEGRASS. (Fig. 190.) Culms erect from a decumbent base, often rather lax, scabrous below the panicle, 30 to 100 cm tall; sheaths retrorsely scabrous or scaberulous, at least toward the summit; ligule 4 to 6 mm long; blades scabrous, 2 to 4 mm wide; panicle oblong, 6 to 15 mm long,

FIGURE 191.—Distribution of *Poa trivialis*.

the lower branches about 5 in a whorl; spikelets usually 2- or 3-flowered, about 3 mm long; lemma 2.5 to 3 mm long, glabrous except the slightly pubescent keel, the web at base conspicuous, the nerves prominent. 2l —Moist places, Newfoundland and Ontario to Virginia, West Virginia, Michigan, South Dakota, and on the Pacific coast from southern Alaska to northern California; on ballast, Louisiana (fig. 191); introduced from Europe. Sometimes used in mixtures for meadows and upastures der the name rough-stalkedn meadow grass.

FIGURE 192.—*Poa marcida*. Panicle, × 1; floret, × 10. (Type.)

23. Poa márcida Hitchc. (Fig. 192.) Culms erect, in small tufts, 40 to 100 cm tall; ligule very short; blades thin, 1 to 3 mm wide; panicle drooping, narrow, 10 to 18 cm long, the capillary branches

FIGURE 193.—*Poa alsodes.* Panicle, × 1; floret, × 10. (Wilson, N.Y.)

somewhat distant, solitary or in pairs, ascending or appressed; spikelets mostly 2-flowered; glumes about 3 mm long; lemmas narrowly lanceolate, acuminate, 4 to 5 mm long, glabrous, long-webbed at base. 2l —Bogs and wet shady places, Vancouver Island to the coast mountains of Oregon.

FIGURE 194.—Distribution of *Poa alsodes.*

24. Poa alsódes A. Gray. (Fig. 193.) Culms in lax tufts, 30 to 60 cm tall; blades thin, lax, 2 to 5 mm wide; panicle 10 to 20 cm long, very open, the slender branches in distant whorls of threes to fives, finally widely spreading, naked below, few-flowered; spikelets 2- or 3-flowered, about 5 mm long; lemmas gradually acute, webbed at base, pubescent on the lower part of the keel, otherwise glabrous, faintly nerved. 2l —Rich or moist woods, Maine to Minnesota, south to Delaware and the mountains of North Carolina and Tennessee (fig. 194).

FIGURE 195.—*Poa languida.* Panicle, × 1; floret, × 10. (Chase 7511, N.Y.)

25. Poa lánguida Hitchc. (Fig. 195.) Culms weak, in loose tufts, 30 to 60 or even 100 cm tall; ligule about 1 mm long; blades lax, 2 to 4 mm wide; panicle nodding, 5 to 10 cm long, the few slender branches

mostly in twos or threes, ascending, few-flowered toward the ends; spikelets 2- to 4-flowered, 3 to 4 mm long; lemmas 2 to 3 mm long, glabrous except the webbed base, oblong, rather obtuse, at maturity firm. 2↓ (*P. debilis* Torr., not Thuill.)—Dry or rocky woods, Newfoundland and Quebec to Wisconsin, south to Pennsylvania, Kentucky, and Iowa (fig. 196).

FIGURE 196.—Distribution of *Poa languida.*

26. Poa saltuénsis Fern. and Wieg. (Fig. 197.) Resembling *P. languida;* differing in the thinner, acute, somewhat longer lemmas. 2↓ —Woodland thickets, Quebec and Newfoundland to Minnesota, south to Connecticut and Maryland (fig. 198).

27. Poa occidentális Vasey. NEW MEXICAN BLUEGRASS. (Fig. 199.) Culms erect, few in a tuft, usually rather stout, scabrous, as much as 1 to 1.5 m tall; sheaths somewhat keeled, retrorsely scabrous (sometimes faintly so); ligule 2 to 8 mm long; blades scabrous, 10 to 20 cm long, 3 to 6 mm wide; panicle open, 15 to 30 cm long, the branches in distant whorls of threes to fives, spreading to reflexed, the lower as much as 10 cm long, spikelet-bearing toward the ends; spikelets 3- to 6-flowered; lemmas 4.5 to 5 mm long, conspicuously webbed at base, villous on the lower part of the keel and the marginal nerves and sometimes sparingly pubescent on the internerves below. 2↓ —Open woods and moist banks at medium altitudes, Colorado and New Mexico (fig. 200).

FIGURE 197.—*Poa saltuensis.* Panicle, × 1; floret, × 10. (Fernald and Pease 24875, Que.)

28. Poa trácyi Vasey. (Fig. 201.) Culms erect, 60 to 80 cm tall; sheaths glabrous, keeled; ligule truncate, about 2 mm long; blades 3 to 5 mm wide; panicle narrowly pyramidal, 15 to 20 cm long, the branches in distant whorls of 2 to 5, spreading, naked on the lower half or two-thirds; spikelets 2- or 3-flowered; lemmas about 3.5 mm long, oblong-lanceolate or the upper lanceolate, webbed at base, villous on keel and marginal nerves, and more or less so on the internerves below, the intermediate nerves distinct. 2↓ —Known only from Raton, N.Mex. May be a form of *P. occidentalis.*

FIGURE 198.—Distribution of *Poa saltuensis.*

29. Poa sylvéstris A. Gray. (Fig. 202.) Culms tufted, erect, 30 to 100 cm tall; sheaths glabrous or rarely pubescent, the lower usually antrorsely scabrous; ligule about 1 mm long; blades lax, 2 to 6 mm wide; panicle erect, 10 to 20 cm long, much longer than wide, the slender flexuous branches spreading, usually 3 to 6 at a node, the lower usually reflexed;

spikelets 2- to 4-flowered, 3 to 4 mm long; lemmas 2.5 to 3 mm long, webbed at base, pubescent on the keel and marginal nerves and more or less pubescent on the internerves. 2l —Rich, moist, or rocky woods, New York to Wisconsin, south to Florida and Texas (fig. 203). Sheaths pubescent in a specimen from St. Louis, Mo.

30. Poa reflexa Vasey and Scribn. NODDING BLUEGRASS. (Fig. 204.) Culms solitary or in small tufts, erect, 20 to 40 cm tall; blades

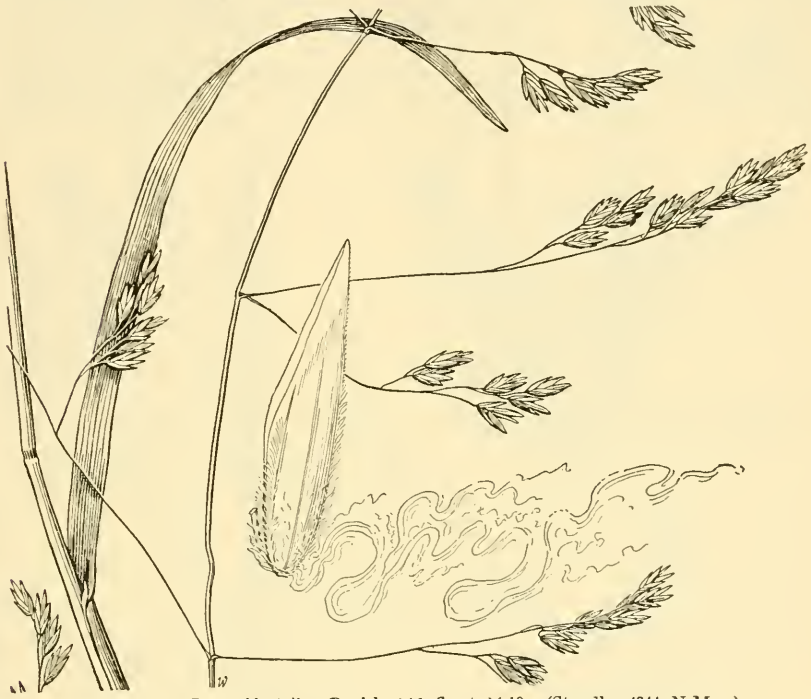

FIGURE 199.—*Poa occidentalis.* Panicle, × 1; floret, × 10. (Standley 4344, N.Mex.)

rather short, 1 to 4 mm wide; panicle nodding, 5 to 15 cm long, the branches naked below, solitary, in pairs, or in threes, the lower usually reflexed, sometimes strongly so; spikelets 2- to 4-flowered; lemmas about 3 mm long, oblong-elliptic, webbed at base, villous on keel and marginal nerves, sometimes on intermediate nerves. 2l — Open slopes and alpine meadows, 2,000 to 4,000 m, Montana to eastern British Columbia, south in the mountains to New Mexico and Arizona (fig. 205).

FIGURE 200.—Distribution of *Poa occidentalis.*

31. Poa wolfii Scribn. (Fig. 206.) Culms tufted, erect, 40 to 80 cm tall; sheaths slightly scabrous; blades crowded toward the base of the culms, mostly 1 to 2 mm wide; panicle drooping, 8 to 15 cm long, the branches ascending, bearing a few spikelets toward the ends, the lower mostly in pairs; spikelets 2- to 4-flowered, 5 to 6 mm long; lemmas 3.5 to 4.5 mm long, acute, webbed at base, pubescent on the keel and marginal nerves, the intermediate nerves distinct. 2l —Moist woods, Ohio to Minnesota and Missouri (fig. 207).

32. Poa paucispícula Scribn. and Merr. (Fig. 208.) Culms tufted, leafy, rather lax, 10 to 30 cm tall, the base often decumbent; blades 1 to 2 mm wide; panicle lax, few-flowered, 2 to 8 cm long, the branches

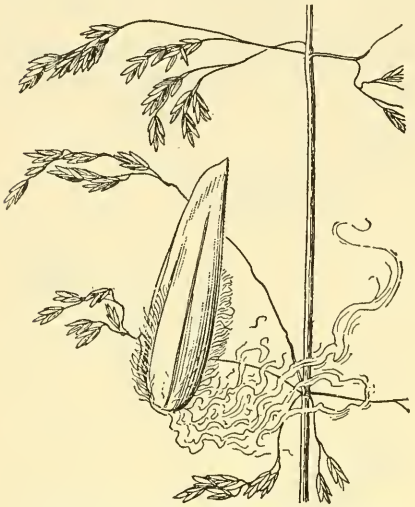

FIGURE 201.—*Poa tracyi.* Panicle, × 1; floret, × 10. (Type.)

FIGURE 203.—Distribution of *Poa sylvestris.*

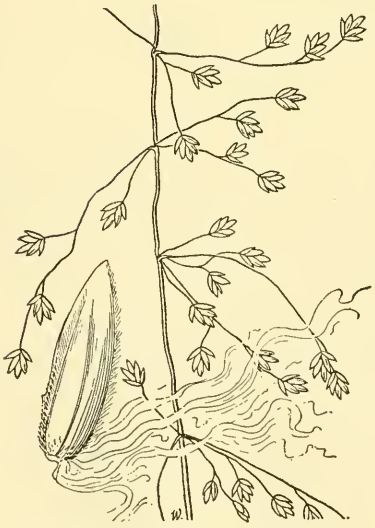

FIGURE 202.—*Poa sylvestris.* Panicle, × 1; floret, × 10. (Wheeler 6, Mich.)

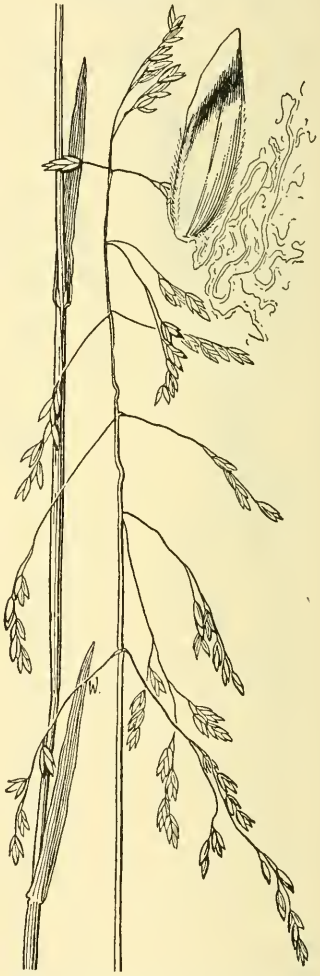

FIGURE 204.—*Poa reflexa.* Panicle, × 1; floret, × 10. (Clokey 11330, Colo.)

in pairs or solitary, naked below; spikelets ovate, purple, 4 to 6 mm long, 2- to 5-flowered; glumes rather broad, acute, 3 to 4 mm long; lemmas 3 to 4 mm long, oblong, obtuse, webbed at base (the web sometimes scant) pubescent on the keel and marginal nerves below.

21 —Rocky slopes, Alaska to Washington (alpine slopes, Mount Rainier, Mount Baker); Glacier National Park, Mont. More leafy than *P. leptocoma*, more tufted, the panicle branches not so long; spikelets broader.

FIGURE 205.—Distribution of *Poa reflexa*.

33. Poa leptocóma Trin. BOG BLUEGRASS. (Fig. 209.) Culms slender, solitary, or few in a tuft, 20 to 50 cm tall, often decumbent at base; sheaths usually slightly scabrous; ligule acute, the uppermost 3 to 4 mm long; blades short, lax, mostly 2 to 4 mm wide; panicle nodding, delicate, few-flowered, the branches capillary, ascending or spreading, subflexuous, the lower mostly in

FIGURE 206.—*Poa wolfii*. Panicle, × 1; floret, × 10. (Deam 33821, Ind.)

pairs; spikelets narrow, 2- to 4-flowered; glumes narrow, acuminate; lemmas 3.5 to 4.5 mm long, acuminate, webbed at base, pubescent on

the keel and marginal nerves or sometimes nearly glabrous, the intermediate nerves distinct. 2l —Bogs, Alaska, south in the mountains to northern New Mexico, Utah, Nevada, and California (Mount Dana) (fig. 210).

34. Poa paludígena Fern. and Wieg. (Fig. 211.) Culms slender, solitary or in small tufts, 15 to 70 cm tall; sheaths minutely scabrous; ligule short, truncate, the uppermost as much as 1.5 mm long; blades

FIGURE 207.—Distribution of *Poa wolfii*.

FIGURE 208.—*Poa paucispicula*. Panicle, × 1; floret, × 10. (Hitchcock 11711, Wash.)

FIGURE 209.—*Poa leptocoma*. Panicle, × 1; floret ×, 10. (Arsène and Benedict 15562, N.Mex.)

rather lax, mostly erect, 0.3 to 2 mm wide; panicle loose and open, mostly 5 to 10 cm long, the branches long and slender, distant, the lower mostly in twos, spikelet-bearing above the middle; spikelets mostly 4 to 5 mm long, narrow, 2- to 5-flowered; lemmas 2.5 to 3.5 mm long, webbed at base with a few long hairs, the keel and lateral nerves pubescent on the lower half or two-thirds, the intermediate nerves glabrous, obscure. 2l —Bogs and springy places, New York and Pennsylvania to Illinois and Wisconsin (fig. 212).

35. Poa bulbósa L. BULBOUS BLUEGRASS. (Fig. 213.) Culms densely tufted, more or less bulbous at base, 30 to 60 cm tall; blades flat or loosely involute, 1 to 2 mm wide; panicle ovoid, mostly 5 to 8 cm long, somewhat contracted, the branches ascending or appressed, some floriferous to base; spikelets mostly proliferous, the florets converted into bulblets; bulblets with a dark purple base (about 2 mm long), the bracts extending into slender green tips 5 to 15 mm

FIGURE 210.—Distribution of *Poa leptocoma*.

FIGURE 211.—*Poa paludigena*. Panicle, × 1; floret, × 10. (Eames and Wiegand 9250, N.Y.)

FIGURE 212.—Distribution of *Poa paludigena*.

FIGURE 213.—*Poa bulbosa*, × 1. (Henderson 6136, Idaho.)

long; unaltered spikelets about 5-flowered; lemmas 2.5 mm long, webbed at base, densely silky on the keel and marginal nerves, the intermediate nerves faint. 2ℓ —Fields and meadows, Virginia and North Carolina; North Dakota; Idaho to British Columbia, and California; Utah; Oklahoma (fig. 214); introduced from Europe.

36. Poa nemorális L. WOOD BLUEGRASS. (Fig. 215.) Culms tufted, 30 to 70 cm tall; ligule very short; blades rather lax, about 2 mm wide; panicle 4 to 10 cm long, the branches spreading; spikelets 2- to 5-flowered, 3 to 5 mm long; glumes narrow, sharply acuminate,

about as long as the first floret; lemmas 2 to 3 mm long, sparsely webbed at base, pubescent on the keel and marginal nerves, the intermediate nerves obscure. 2↓ —Occasional in meadows from Newfoundland to Delaware and Michigan; Oregon (ballast, near Portland) (fig. 216); introduced from Europe. Differing from *P. palustris* and *P. interior* in the very short ligule and the narrow acuminate glumes.

FIGURE 214.—Distribution of *Poa bulbosa*.

37. Poa macrocláda Rydb. (Fig. 217.) Culms 50 to 80 cm tall, glabrous; ligule prominent, 2 to 3 mm long; blades 2 to 3 mm wide; panicle open, 10 to 20 cm long, pyramidal, the branches spreading, distant, in twos or threes, as much as 8 cm long, naked on the lower half or two-thirds; spikelets about 6 mm long, 2- or 3-flowered, purple; glumes 3.5 to 4 mm long; lemmas 4 to 4.5 mm long, pubescent on the keel and marginal nerves, the web scant or wanting. 2↓ —Moist places, at medium altitudes, Colorado,

FIGURE 216.—Distribution of *Poa nemoralis*.

Montana, and Idaho; a little known species, allied to *P. palustris*, but with larger spikelets.

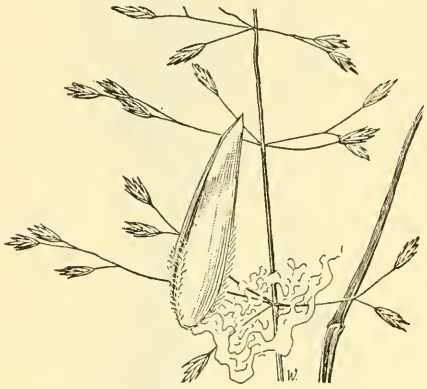

FIGURE 215.—*Poa nemoralis*. Panicle, × 1; floret, × 10. (Hitchcock 23662, Newfoundland.)

38. Poa palústris L. FOWL BLUEGRASS. (Fig. 218.) Culms loosely tufted, glabrous, decumbent at the flattened purplish base, 30 to 150 cm tall; sheaths keeled, sometimes scaberulous; ligule 3 to 5 mm long, or only 1 mm on the innovations; blades 1 to 2 mm wide; panicle

FIGURE 217.—*Poa macroclada*. Panicle, × 1; floret, × 10. (Dupl. type.)

pyramidal or oblong, nodding, yellowish green or purplish, 10 to 30 cm long, the branches in rather distant fascicles, naked below;

spikelets 2- to 4-flowered, about 4 mm long; glumes lanceolate, acute, shorter than the first floret; lemmas 2.5 to 3 mm long, usually bronzed at the tip, webbed at base, villous on the keel and marginal nerves, the intermediate nerves faint. 2l —Meadows and moist open

FIGURE 218.—*Poa palustris.* Panicle, × 1; floret, × 10. (Suksdorf 7022, Wash.)

ground, at low and medium altitudes, Newfoundland and Quebec, south to Virginia, Missouri, Nebraska, New Mexico, and California (Sierra Valley) (fig. 219); Eurasia.

39. Poa intérior Rydb. INLAND BLUEGRASS. (Fig. 220.) Culms erect from a usually densely tufted erect base, commonly rather stiff, often scabrous below the panicle, 20 to 50 cm tall; sheaths slightly keeled or terete; ligule evident but usually less than 1 mm long; blades 1 to 2 mm wide; panicle narrowly pyramidal, 5 to 10 cm long, the branches ascending; spikelets about as in *P. palustris.* 2l —Grassy slopes and open woods at medium altitudes, usually not extending much above timberline, Quebec to British Columbia and Washington, south to Vermont, Michigan, Minnesota, western Nebraska, New Mexico, and Arizona (fig. 221).

FIGURE 219.—Distribution of *Poa palustris.*

FIGURE 220.—*Poa interior.* Panicle, × 1; floret, × 10. (Clements 297, Colo.)

4. Alpínae.—Perennials without creeping rhizomes; lemmas not webbed at base, pubescent on the keel or on the marginal nerves, or both, sometimes also pubescent on internerves.

40. Poa fendleriána (Steud.) Vasey. MUTTON GRASS. (Fig. 222.) Incompletely dioecious; culms erect, tufted, scabrous below the panicle, 30 to 50 cm tall; sheaths somewhat scabrous; ligule less than 1 mm long, not noticeable viewed from the side of the sheath; blades mostly basal, folded or involute, firm and stiff; panicle long-exserted, oblong, contracted, pale, 2 to 7 cm long; spikelets 5-

or 6-flowered, about 8 mm long; glumes broad, 3 mm long; lemmas 4 mm long, villous on lower part of keel and marginal nerves, the intermediate nerves obscure; pistillate spikelets with minute stamens, the anthers about 0.2 mm long. 2l —Mesas, open dry woods, and rocky hills at medium altitudes, Manitoba to British Columbia, south through western South Dakota (Black Hills) and Idaho to western Texas (Chisos Mountains) and California; northern Mexico (fig. 223). A very small proportion of specimens have been found with well-developed stamens having large anthers, the pistil also developed.

FIGURE 221.—Distribution of *Poa interior.*

FIGURE 223.—Distribution of *Poa fendleriana.*

41. Poa longilígula Scribn. and Will. LONGTONGUE MUTTON GRASS. (Fig. 224.) Differing from *P. fendleriana* in the prominent ligule, as much as 5 to 7 mm long and in the looser, often longer usually greenish panicle. 2l —North Dakota to Oregon, south to New Mexico and California (fig. 225).

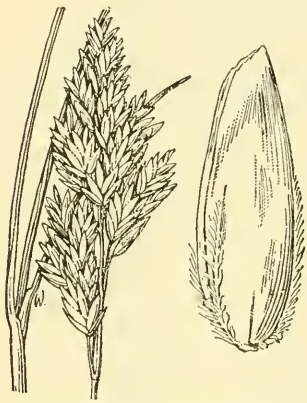

FIGURE 222.—*Poa fendleriana.* Panicle, × 1; floret, × 10. (Eggleston 6463, N.Mex.)

FIGURE 224.—*Poa longiligula.* Ligule, × 1. (Jones 5149, Utah.)

42. Poa autumnális Muhl. (Fig. 226.) Culms in rather large lax tufts, 30 to 60 cm tall; blades 2 to 3 mm wide, numerous at base; panicle 10 to 20 cm long, about as broad, very open, the capillary flexuous branches spreading, bearing a few spikelets near the ends; spikelets 4- to 6-flowered, about 6 mm long; lemmas oblong, obtusely rounded at the scarious compressed apex, villous on the keel and marginal nerves, pubescent on the internerves below or sometimes nearly to apex. 2l —Moist woods, New Jersey to Michigan and Illinois, south to Florida and Texas (fig. 227).

FIGURE 225.—Distribution of *Poa longiligula.*

43. Poa alpína L. ALPINE BLUEGRASS. (Fig. 228.) Culms erect from a rather thick vertical crown, rather stout, 10 to 30 cm tall; blades short, 2 to 5 mm wide, the uppermost about the middle of the culm; panicle ovoid or short-pyramidal, rather compact, 1 to 8 cm long, the lower branches often reflexed; spikelets broad, purple or purplish; glumes broad, abruptly acute; lemmas 3 to 4 mm long, strongly villous on the keel and marginal nerves, pubescent on the internerves below, the intermediate nerves faint. 2l —Mountain meadows, arctic regions of the Northern Hemisphere, extending south to Quebec, northern Michigan (Keweenaw Point), and the alpine summits of Colorado, Utah, and Oregon (Wallowa Mountains); Mexico (fig. 229).

44. Poa stenántha Trin. (Fig. 230.) Culms tufted, 30 to 50 cm tall; ligule prominent, as much as 5 mm long; blades flat or loosely involute, rather lax, mostly basal, 1 to 2 mm wide, the uppermost culm leaf below the middle of the culm; panicle nodding, 5 to 15 cm long, the branches in twos or threes, arcuate-drooping, naked below, with a few spikelets at the ends; spikelets 3- to 5-flowered, 6 to 8 mm long; lemmas about 5 mm long, pubescent on the lower part of keel

FIGURE 226.—*Poa autumnalis*. Panicle, × 1; floret, × 10. (Curtiss 6787, Ga.)

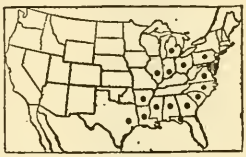

FIGURE 227.—Distribution of *Poa autumnalis*.

FIGURE 228.—*Poa alpina*. Panicle, × 1; floret, × 10. (Eggleston 11824, Colo.)

FIGURE 229.—Distribution of *Poa alpina*.

and marginal nerves, sparsely pubescent on the internerves below. 2↓ —Moist open ground, Alaska, Alberta, and British Columbia, extending into Montana, Colorado (White River Forest), Idaho, Washington (Nooksack River), and Oregon (Crater Lake) (fig. 231).

45. Poa glaúca Vahl. (Fig. 232.) Plants glaucous, in close or loose tufts; culms erect, stiff, 10 to 30 cm tall, sometimes taller, naked above, the uppermost leaf usually much below the middle; ligule of uppermost leaf about 2 mm long; blades mostly basal, 3 to 5 cm long, 1 to 2 mm wide; panicle 3 to 7 cm long, narrow, rather compact, the

branches erect or ascending, few-flowered; spikelets mostly 2- or 3-flowered, 5 to 6 mm long; lemmas 3 to 4 mm long, strongly pubescent on the lower half of the keel and marginal nerves and slightly pubescent on the faint intermediate nerves. 2l —Rocky slopes, arctic regions south to the alpine summits of New Hampshire and Vermont. Common in Greenland.

FIGURE 230.—*Poa stenantha*. Panicle, × 1; floret, × 10. (Blankinship, Mont.)

46. Poa láxa Haenke. (Fig. 233.) Plants in loose lax bunches; culms weak and slender, 10 to 20 or sometimes 30 cm tall; ligule truncate, about 1 mm long; blades mostly basal, lax, mostly about 1 mm wide; panicle narrow but loose, few-flowered, 2 to 6 cm long, the branches ascending, naked below; spikelets 2- to 4-flowered, about 5 mm long; lemmas 3 to 3.5 mm long, densely villous on the lower half of the keel and marginal nerves, sometimes sparsely webbed at base. 2l —Rocky slopes, Newfoundland and Quebec to the alpine summits of Maine, New Hampshire, Vermont, and New York (fig. 234); Europe. Common on the upper cone of Mount Washington.

FIGURE 231.—Distribution of *Poa stenantha*.

47. Poa pattersóni Vasey. PATTERSON BLUEGRASS. (Fig. 235.) Culms in dense tufts with numerous basal leaves, 10 to 20 cm tall; blades usually folded, rather lax, mostly less than 10 cm long, about 1 mm wide;

FIGURE 232.—*Poa glauca*. Panicle, × 1; floret, × 10. (Hitchcock 16053, N.H.)

FIGURE 233.—*Poa laxa*. Panicle, × 1; floret, × 10. (Fernald, Maine.)

FIGURE 234.—Distribution of *Poa laxa*.

panicle narrow, condensed, purplish, 1 to 4 cm long; spikelets 2- or 3-flowered, 5 to 6 mm long; lemmas about 4 mm long, strongly pubescent on the keel and marginal nerves, short-pubescent on the internerves, sometimes sparsely webbed at base. 2l —Alpine

regions, Montana, Wyoming, Utah, and Colorado; Oregon (Mount Hood) (fig. 236).

48. Poa rupícola Nash. TIMBERLINE BLUEGRASS. (Fig. 237.) Culms densely tufted, erect, rather stiff, often scaberulous below the panicle, 10 to 20 cm tall; blades short, 1 to 1.5 mm wide; panicle narrow, purplish, 2 to 4 cm long, the short branches ascending or appressed; spikelets usually purple, about 3-flowered; lemmas villous below on keel and marginal nerves and sometimes pubescent on the internerves below. 2l —Rocky slopes, British Columbia, south in the mountains, at high altitudes through Montana to northern New Mexico, Arizona, Oregon (Mount Hood and Wallowa Mountains), and California (Mono Pass, Sheep Mountain) (fig. 238). Small specimens of *P. interior*, which resemble this, differ in having a small web at the base of the lemma.

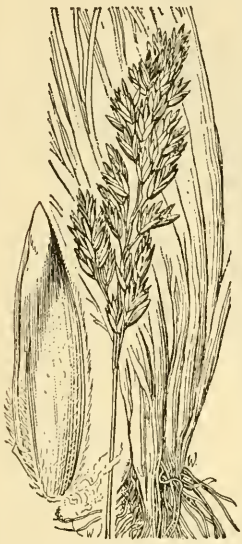

FIGURE 235.—*Poa pattersoni*. Plant, × 1; floret, × 10. (Patterson 154, Colo.)

FIGURE 236.—Distribution of *Poa pattersoni*.

5. Épiles.—Perennials without rhizomes; lemmas not webbed at base, glabrous or scabrous (minutely pubescent in *P. unilateralis*).

49. Poa involúta Hitchc. (Fig. 239.) In dense pale tufts; culms slender, 30 to 40 cm tall; ligule very short; blades involute, slender, 15 to 25 cm long, glabrous or slightly scabrous; panicle open, 10 to 15 cm long, the branches in pairs, few-flowered near the ends; spikelets mostly 3- or 4-flowered, 5 to 6 mm long; lemmas 3 to 4 mm long, scabrous. 2l —Known only from the Chisos Mountains, Tex.

FIGURE 238.—Distribution of *Poa rupicola*.

50. Poa cusíckii Vasey. CUSICK BLUEGRASS. (Fig. 240.) Culms in dense often large tufts, erect, 20 to 60 cm tall; ligule very short; blades filiform, erect, scabrous, mostly basal; panicle usually pale or tawny, narrow, oblong, contracted, or somewhat open at anthesis, 3 to 8 cm long; spikelets 7 to 9 mm long; lemmas 4.5 to 6 mm long, smooth or scabrous. 2l —Dry or rocky slopes at medium and high altitudes, Alberta to British Columbia, south to Colorado, Nevada, and the central Sierras of California (fig. 241).

FIGURE 237.—*Poa rupicola*. Plant, × 1; floret, × 10. (Swallen 1348, Colo.)

51. Poa unilaterális Scribn. (Fig. 242.) Culms in dense tufts, 10 to 40 cm tall, sometimes decumbent at base; sheaths

tawny, papery; blades flat or folded, shorter than the culms; panicle

FIGURE 239.—*Poa involuta*. Plant, × 1; floret, × 10. (Swallen 1110, Tex.)

oblong, dense and spikelike or somewhat interrupted below, 2 to 6 cm long; spikelets 6 to 8 mm long; glumes broad, acute; lemmas 3 to 4 mm long, glabrous except for a few short hairs on the nerves below. 2|. (*P. pachypholis* Piper.)

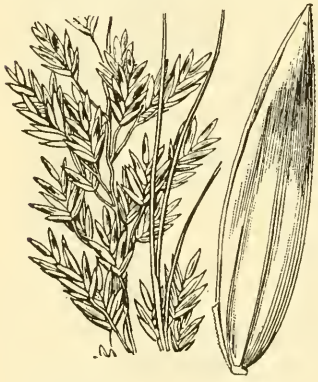

FIGURE 240.—*Poa cusickii*. Panicle, × 1; floret, × 10. (Howell 183, Oreg.)

FIGURE 241.—Distribution of *Poa cusickii*.

—Cliffs, bluffs, and rocky meadows near the seashore, Washington (Ilwaco); California (Humboldt Bay to Monterey).

52. Poa épilis Scribn. SKYLINE BLUEGRASS. (Fig. 243.) Culms erect from a rather loose base, solitary or

few in a tuft, 20 to 40 cm tall; ligule about 3 mm long; blades of the culm about 3, flat, 3 to 6 cm long, 2 to 3 mm wide, of the innovations narrow, longer and usually folded or involute; panicle usually condensed, ovoid, 2 to 6 cm long, long-exserted, usually purple, the lower branches naked below, ascending or appressed; spikelets 3-flowered, about 5 mm long; lemmas 4 to 5 or even 6 mm long, glabrous or minutely scabrous. 2l —Mountain meadows, mostly above timber line, Alberta to British Columbia, south to Colorado, Utah, Nevada, and California (fig. 244).

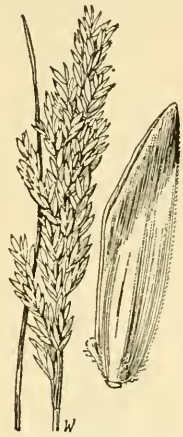

FIGURE 242.—*Poa unilateralis.* Panicle, × 1; floret, × 10. (Chase 5653, Calif.)

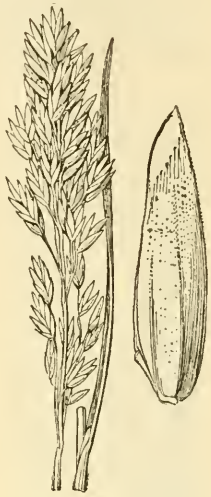

FIGURE 243.—*Poa epilis* Panicle, × 1; floret, × 10 (Type.)

53. Poa vaseyóchloa Scribn. (Fig. 245.) In small dense soft lax tufts; culms erect, 10 to 20 cm tall; ligule acute, about 3 mm long; blades lax, mostly folded or involute, in a basal tuft, mostly less than 5 cm long, with one or two short ones on the culm, narrow or filiform; panicle ovate, 2 to 4 cm long, few-flowered, open, the slender branches spreading, bearing 1 or 2 spikelets; spikelets purple, 3- to 6-flowered; glumes 2 to 3 mm long, rather broad; lemmas smooth or minutely scabrous, 3 mm long. 2l —Rocky slopes, Cascade Mountains of Washington and Oregon in the vicinity of Columbia River, and the Wallowa Mountains of Oregon.

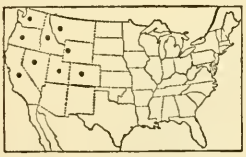

FIGURE 244.—Distribution of *Poa epilis.*

FIGURE 245.—*Poa vaseyochloa.* Plant, × 1; floret, × 10. (Type.)

54. Poa prínglei Scribn. (Fig. 246.) Densely tufted; culms 10 to 20 cm tall; lower sheaths loose, papery; blades mostly basal, involute, mostly 2 to 5 cm long, sometimes longer, glabrous on the exposed surface, puberulent on inner surface; panicle narrow, condensed, usually pale or silvery, few- to several-flowered, 1 to 5 cm long; spikelets 3- to 5-flowered, 6 to 8 mm long; glumes equal, broad, 4 to 5 or rarely 7 mm long; lemmas 5 to 6, rarely 8 mm long, smooth or scabrous.

2l —Rocky alpine summits, Montana to Washington, south to Nevada (Mount Rose) and California (fig. 247).

55. Poa lettermâni Vasey. (Fig. 248.) In low lax tufts; culms mostly less than 10 cm tall, usually scarcely exceeding the blades; ligule 1 to 2 mm long; blades lax, usually not more than 1 mm wide; panicle narrow, contracted, 1 to 3 cm long; spikelets 3- or 4-flowered, 4 to 5 mm long; glumes equal, somewhat acuminate, about as long as the first and second florets; lemmas erose at summit, 2.5 to 3 mm long. 2l —Rocky alpine summits, British Columbia, Washington, Colorado (fig. 249).

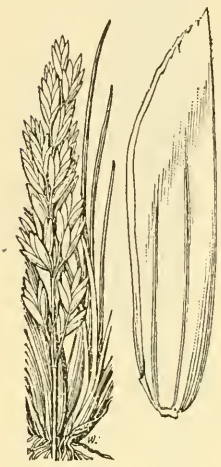

FIGURE 246.—*Poa pringlei.* Plant, × 1; floret, × 10. (Henderson 3080, Idaho.)

FIGURE 248.—*Poa lettermani.* Plant, × 1; floret, ×10. (Letterman, Colo.)

56. Poa leibérgii Scribn. LEIBERG BLUEGRASS. (Fig. 250) Usually densely tufted; culms 10 to 30 cm tall, erect; ligule 1 to 2 mm long; blades mostly basal, firm, involute, usually less than 10 cm long; panicle narrow, 2 to 5 cm long, often purple, the branches short, appressed or ascending; spikelets 2- to 4-flowered, 4 to 6 mm long; lemmas 3 to 4 mm long, smooth or scaberulous. 2l —Alpine meadows and sterile gravelly alpine flats, eastern Oregon and the Sierras of California.

6. Scabréllae.—Perennials, without rhizomes, tufted, with numerous basal leaves; spikelets little compressed, narrow, much longer than wide; lemmas convex, crisp-puberulent on the back towards the base, the keels obscure, the marginal and intermediate nerves usually faint. The whole group of Scabrellae is made up of closely related species which appear to intergrade.

57. Poa scabrélla (Thurb.) Benth. PINE BLUEGRASS. (Fig. 251.) Culms erect, 50 to 100 cm tall, usually scabrous at least below the panicle; sheaths scaberulous; ligule 3 to 5 mm long; blades mostly basal, 1 to 2 mm wide, lax, more or less scabrous; panicle narrow, usually contracted, sometimes rather open at base, 5 to 12 cm long;

FIGURE 247.—Distribution of *Poa pringlei.*

FIGURE 249.—Distribution of *Poa lettermani.*

FIGURE 250.—*Poa leibergii.* Plant, × 1; floret, × 10. (Type.)

FIGURE 251.—*Poa scabrella*. Plant, × ½; spikelet, × 5; floret, × 10. (Chase 5697, Calif.)

spikelets 6 to 10 mm long; glumes 3 mm long, scabrous; lemmas 4 to 5 mm long, crisp-puberulent on the back toward base. 2l —Meadows, open woods, rocks, and hills, at low and medium altitudes, western Montana and southern Washington to California; Baja California (fig. 252). A form, like *P. scabrella* in other respects but with smooth lemmas, has been differentiated as *P. limosa* Scribn. and Will.—California (Mono Lake and Truckee).

58. Poa gracíllima Vasey. SLENDER BLUEGRASS. (Fig. 253.) Culms rather loosely tufted, 30 to 60 cm tall, usually decumbent at base; ligule 2 to 5 mm long, shorter on the innovations; blades flat or folded, lax, from filiform to 1.5 mm wide; panicle pyramidal, loose,

FIGURE 252.—Distribution of *Poa scabrella*.

rather open, 5 to 10 cm long, the branches in whorls, the lower in twos to sixes, spreading or sometimes reflexed, naked below; spikelets 4 to 6 mm long; second glume 3 to 4 mm long; lemmas minutely scabrous, crisp-pubescent near

FIGURE 254. Distribution of *Poa gracillima*.

base, especially on the nerves. 2l —Cliffs and rocky slopes, Alberta to Alaska, south to Wyoming, northern Nevada, and the southern Sierras of California (fig. 254). *Poa tenerrima* Scribn. is a form with open few-flowered panicles; Southern Coast Ranges, California; *P. multnomae* Piper is a loose lax form in which the ligules on the innovations are short and truncate; wet cliffs, Multnomah Falls, Oreg.

FIGURE 253.—*Poa gracillima*. Plant, × 1; floret, × 10. (Sandberg and Leiberg 747, Wash.)

59. Poa secúnda Presl. SANDBERG BLUEGRASS. (Fig. 255.) Culms erect from a dense often extensive tuft of short basal foliage, commonly not more than 30 cm, but sometimes up to 60 cm tall; ligule acute,

rather prominent; blades rather short, soft, flat, folded, or involute; panicle narrow, 2 to 10 cm long, the branches short, appressed, or somewhat spreading in anthesis; spikelets about as in *P. gracillima*. 2l (*P. sandbergii* Vasey.)—Plains, dry woods, rocky slopes, at medium and upper altitudes, but not strictly alpine, North Dakota to Yukon Territory, south to Nebraska, New Mexico, Utah, Nevada, and southern California; Chile (fig. 256).

60. Poa cánbyi (Scribn.) Piper. CANBY BLUEGRASS. (Fig. 257.) Green or glaucous; culms 50 to 120 cm tall; ligule 2 to 5 mm long; blades flat or folded; panicle narrow, compact or rather loose, 10 to 15 cm long, sometimes as much as 20 cm, the branches short, appressed; spikelets 3- to 5-flowered; lemmas more or less crisp-pubescent on lower part of back. 2l (*P. lucida* Vasey; *P. laevigata* Scribn.)—Sandy or dry ground, Michigan (Isle Royal) and Minnesota to Yukon Territory, south to western Nebraska, Colorado, Arizona, eastern Oregon, and eastern Washington; Quebec (fig. 258). *Poa lucida* has a slender but somewhat loose pale or shining panicle; *P. canbyi* has a denser, compact, dull green panicle, but the two forms grade into each other. *Poa lucida* is more common in Colorado and Wyoming; *P. canbyi* more common in Montana. The pubescence on the lemma may be obvious or obscure.

FIGURE 255. *Poa secunda*. Plant, × 1; floret, × 10. (Hitchcock 23202, Wyo.)

FIGURE 256.—Distribution of *Poa secunda*.

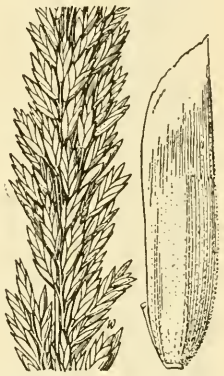

FIGURE 257.—*Poa canbyi*. Panicle, × 1; floret × 10. (Williams 2787, Wyo.)

FIGURE 258.—Distribution of *Poa canbyi*.

7. Nevadénses.—Perennials, without rhizomes, tufted; spikelets little compressed, narrow, much longer than wide; lemmas convex on the back, glabrous or minutely scabrous, not crisp-puberulent; keels obscure, marginal and intermediate nerves usually faint.

61. Poa nevadénsis Vasey. NEVADA BLUEGRASS. (Fig. 259.) Culms erect, 50 to 100 cm tall; sheaths scabrous, sometimes only slightly so; ligule about 4 mm long, shorter on the innovations, decurrent; blades usually elongate, narrow, involute, sometimes almost capillary, rather stiff; panicle narrow, 10 to 15 cm long, pale, rather loose, the branches short-appressed; spikelets 3 -to 5-flowered, 6 to 8 mm long; glumes narrow, the second about as long as the lowest floret; lemmas 4 to 5 mm long, rather obtuse at the scarious tip. 2l —Low

meadows and wet places, Montana to eastern Washington and Yukon Territory, south to Colorado and the Sierras and San Bernardino Mountains, California; on wool waste in Maine (North Berwick) (fig. 260).

FIGURE 259.—*Poa nevadensis*. Panicle, × 1; floret, × 10. (Parish Bros. 1543, Calif.)

62. Poa curtifólia Scribn. (Fig. 261.) Culms several in a tuft from firm branched crowns, 10 to 20 cm tall; ligule prominent, the uppermost as much as 5 mm long; blades short, the lower 1.5 to 2 cm long, 2 to 3 mm wide, the upper successively smaller, the uppermost near the panicle, much reduced; panicle narrow, 3 to 6 cm long; spikelets about 3-flowered; glumes equal, 5 mm long, the first acuminate, the second broad, rather obtuse; lemmas 5 to 5.5 mm long. 2l —Known only from central Washington.

FIGURE 260.—Distribution of *Poa nevadensis*.

63. Poa juncifólia Scribn. ALKALI BLUEGRASS. (Fig. 262.) Pale; culms erect, 50 to 100 cm tall; ligules short, those of the innovations not visible from the sides; blades involute, smooth, rather stiff; panicle narrow, 10 to 20 cm long, the branches appressed; spikelets 3- to 6-flowered, 7 to 10 mm long; glumes about equal; lemmas about 4 mm long. 2l (*P. brachyglossa* Piper.) —Alkaline meadows, Montana to British Columbia, south to Colorado and east of the Cascades to northeastern California (fig. 263).

64. Poa ámpla Merr. BIG BLUEGRASS. (Fig. 264.) Green or glaucous; culms 80 to 120 cm tall; sheaths smooth, rarely scaberulous; ligule short, rounded; blades 1 to 3 mm wide; panicle narrow, 10 to 15 cm long, usually rather dense; spikelets 4- to 7-flowered, 8 to 10 mm long; lemmas 4 to 6 mm long. 2l —Meadows and moist open ground or dry or rocky slopes, Montana to Yukon Territory, south to New Mexico, Arizona, and California (fig. 265). The typical form is robust and more or less glaucous: this grades into a smaller green form, more common in the eastern part of the range (*P. confusa* Rydb.). Occasional specimens of the typical form have short rhizomes.

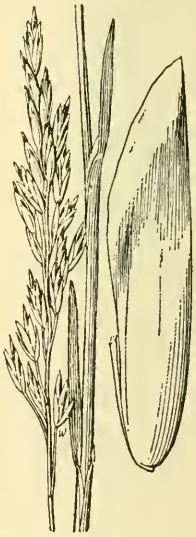

FIGURE 261.—*Poa curtifolia*. Panicle, × 1; floret, × 10. (Dupl. type.)

11. BRÍZA L. Quaking grass

Spikelets several-flowered, broad, often cordate, the florets crowded and spreading horizontally, the rachilla disarticulating above the glumes and between the florets; glumes about equal, broad, papery-chartaceous, with scarious margins; lemmas papery, broad, with scarious spreading margins, cordate at base, several-nerved, the nerves often obscure, the apex in our species obtuse or acutish; palea much shorter than the lemma. Low annuals or perennials, with erect culms, flat blades, and usually open, showy panicles, the pedicels in our species capillary, allowing the spikelets to vibrate in the wind. Standard species, *Briza media*. Name from Greek, *Briza*, a kind of grain, from *brizein*, to nod.

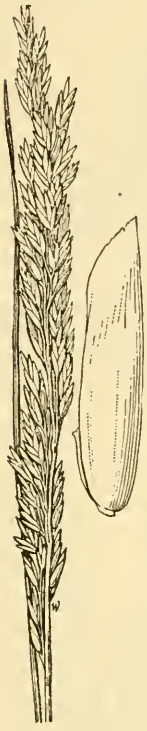

FIGURE 262.—*Poa juncifolia*. Panicle, × 1; floret, × 10. (Type.)

The three species found in this country are introduced from Europe. They are of no importance agriculturally except insofar as *B. minor* occasionally forms an appreciable part of the spring forage in some parts of California. *B. maxima* is sometimes cultivated for ornament, because of the large showy spikelets.

FIGURE 263.—Distribution of *Poa juncifolia*.

Panicle drooping; spikelets 10 mm wide ..... 1. B. MAXIMA.
Panicle erect; spikelets 4 to 5 mm wide.
  Plants perennial; upper ligule 1 mm long; spikelets about 5 mm long ..... 3. B. MEDIA.
  Plants annual; upper ligule 5 mm or more long; spikelets about 3 mm long ..... 2. B. MINOR.

1. Briza máxima L. Big quaking grass. (Fig. 266, *B*.) Annual; culms erect or decumbent at base, 30 to 60 cm tall; panicle drooping, few-flowered; spikelets ovate, 12 mm long or more, 10 mm broad, the pedicels slender, drooping; glumes and lemmas usually purple or brown margined. ⊙ —Sometimes cultivated for ornament; sparingly escaped in California (Monterey County).

FIGURE 265.—Distribution of *Poa ampla*.

2. Briza mínor L. Little quaking grass. (Fig. 266, *A*.) Annual; culms erect, 10 to 40 cm tall; ligule of the upper leaf 5 mm long or more, acute; blades 2 to 10 mm wide; panicle 5 to 12 cm long, the branches stiffly ascending, the spikelets pendent, triangular-ovate, 3- to 6-flowered, about 3 mm long. ⊙ —Introduced at several

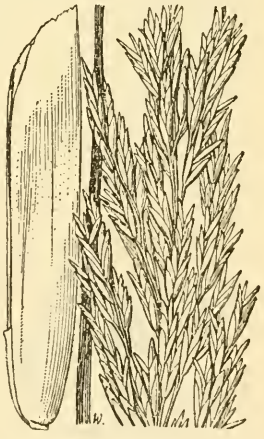

FIGURE 264.—*Poa ampla*. Panicle, × 1; floret, × 10. (Crandall 205, Colo.)

FIGURE 266.—*A, Briza minor.* Plant, × ½; spikelet and floret, × 5. (Hitchcock 2597, Calif.) *B, B. maxima,* × ½. (Baenitz, Dalmatia.) *C, B. media.* Panicle, × ½. (Oakes, Mass.)

localities in the Eastern States from Canada to Alabama and Arkansas, becoming common on the Pacific coast. especially in California (fig. 267).

3. Briza média L. (Fig. 266, *C.*) Perennial; culms 15 to 60 cm tall; ligule of the upper leaf about 1 mm long, truncate; blades 2 to 5 mm wide; panicle erect, 5 to 10 cm long, the branches rather stiff, ascending, naked below; spikelets 5- to 12-flowered, orbicular, about 5 mm long. ♃ —Fields and waste places, sparingly introduced, Ontario to Connecticut and Michigan (fig. 268).

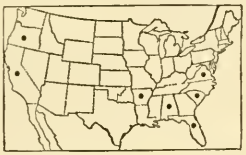

FIGURE 267.—Distribution of *Briza minor.*

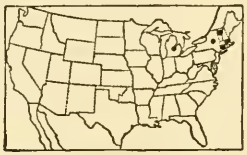

FIGURE 268.—Distribution of *Briza media.*

DESMAZÉRIA SÍCULA (Jacq.) Dum. Low annual; culms spreading with ascending ends; panicles simple, 3 to 5 cm long, with large flat 2-ranked spikelets. ⊙ —Occasionally cultivated for ornament. Europe. (Name sometimes spelled *Demazeria.*)

12. ERAGRÓSTIS Beauv. LOVEGRASS

Spikelets few- to many-flowered, the florets usually closely imbricate, the rachilla disarticulating above the glumes and between the florets, or continuous, the lemmas deciduous, the paleas persistent; glumes somewhat unequal, shorter than the first lemma, acute or acuminate, 1-nerved, or the second rarely 3-nerved; lemmas acute or acuminate, keeled or rounded on the back, 3-nerved, the lateral nerves sometimes obscure; palea usually about as long as the lemma, the keels sometimes ciliate. Annuals or perennials of various habit, the inflorescence an open or contracted panicle. Type species, *Eragrostis eragrostis* Beauv. (*E. poaeoides*). Name from the Greek *eros*, love, and *agrostis*, a kind of grass.

Although the species are numerous, they in general appear to have little forage value. *Eragrostis intermedia* is said to furnish forage on the grazing lands of Arizona and New Mexico.

1a. Plants annual.
2a. Plants creeping, rooting at the nodes, forming mats.
Plants with perfect flowers; anthers 0.2 mm long ..... 11. E. HYPNOIDES.
Plants dioecious; anthers 2 mm long ..... 10. E. REPTANS.
2b. Plants often decumbent at base but not creeping and forming mats.
3a. Palea prominently ciliate on the keels, the cilia usually as long as the width of the lemma.
Panicle interruptedly spikelike, rarely somewhat open; spikelets usually 3 to 4 mm long ..... 7. E. CILIARIS.
Panicle narrow but open, the pedicels ascending or spreading; spikelets 2 mm long ..... 8. E. AMABILIS.
3b. Palea scabrous to short-ciliate.
4a. Panicle long, narrow, rather dense, tawny or stramineous; spikelets 2 to 3 mm long ..... 9. E. GLOMERATA.
4b. Panicle more or less open; spikelets usually more than 3 mm long.
5a. Spikelets sessile or nearly so ..... 12. E. SIMPLEX.
5b. Spikelets pediceled.
6a. Spikelets mostly less than 5-flowered; lemmas obscurely nerved, scarcely keeled.

Panicles two-thirds the entire length of the plant or more, diffuse; pedicels more than 5 mm long; culms erect, closely tufted. 14. E. CAPILLARIS.

Panicles less than half the entire length of the plant, oblong, open but scarcely diffuse; pedicels mostly less than 5 mm long; culms spreading or decumbent at base---------- 15. E. FRANKII.

6b. Spikelets mostly more than 5-flowered.

7a. Spikelets ovate to oblong, flat, the florets spreading, closely imbricate---------- 13. E. UNIOLOIDES.

7b. Spikelets oblong to linear, the florets appressed.

8a. Plants with minute glandular depressions on the branches and often on the keels of the lemmas.

Lemmas not glandular on the keel.

Panicle narrow, rather dense, the branches with scattering glandular depressions---------- 22. E. LUTESCENS.

Panicle open, the branches and pedicels widely spreading, the latter with a glandular depression below the spikelet. 28. E. SUAVEOLENS.

Lemmas glandular on the keel.

Spikelets 2.5 to 3 mm wide; panicle usually rather dense; anthers 0.5 mm long---------- 23. E. CILIANENSIS.

Spikelets about 1.5 mm wide; panicle open; anthers 0.2 mm long---------- 24. E. POAEOIDES.

8b. Plants not glandular on the branches nor lemmas, sometimes glandular on the sheaths (*E. neomexicana*) and below the nodes (*E. barrelieri*).

Spikelets about 1 mm wide, linear, slender.

Plant delicate; spikelets 3 to 5 mm long; lemmas 1 to 1.5 mm long---------- 16. E. PILOSA.

Plant rather stout; spikelets 5 to 7 mm long; lemmas about 2 mm long---------- 21. E. ORCUTTIANA.

Spikelets 1.5 mm wide or wider, ovate to linear.

Panicle narrow, the branches ascending, spikelet-bearing nearly to base, few-flowered; spikelets linear, mostly 10- to 15-flowered---------- 25. E. BARRELIERI.

Panicle open, often diffuse.

Spikelets linear, mostly 8- to 15-flowered, on slender spreading pedicels mostly longer than the spikelets. 29. E. ARIDA.

Spikelets ovate to linear, if linear not on spreading pedicels.

Spikelets linear at maturity, appressed along the primary panicle branches, these naked at the base for usually 5 to 10 mm. Lower lemmas 1.5 mm long.

Primary panicle branches simple or the lower with a branchlet bearing 2 or 3 spikelets; spikelets loosely imbricate or sometimes not overlapping; plants slender, mostly less than 30 cm tall, the culms slender at base. Chiefly east of the 100th meridian---------- 17. E. PECTINACEA.

Primary panicle branches usually bearing appressed branchlets with few to several-spikelets, the spikelets thus appearing imbricate or crowded along the primary branches; plants more robust, mostly more than 30 cm tall, the culms stouter at the base. Chiefly from Texas to southern California---------- 18. E. DIFFUSA.

Spikelets ovate to ovate-oblong, rarely linear, if linear not appressed along the primary panicle branches.

Plants comparatively robust, usually more than 25 cm tall. Texas to southern California.

Panicle large, the branches many-flowered, ascending or drooping. Plant as much as 1 m tall, with blades as much as 1 cm wide, but often smaller---------- 26. E. NEOMEXICANA.

Panicle smaller and more open, the spreading branches few-flowered. Plant usually less than 30 cm tall---------- 27. E. MEXICANA.

Plants delicate, mostly less than 25 cm tall; blades mostly not more than 2 mm wide (see also *E. frankii* var. *brevipes*).
Panicle lax, the branches usually naked at base; spikelets 4 to 7 mm long.
19. E. TEPHROSANTHOS.
Panicle rather stiff, the branches often floriferous nearly to the base; spikelets mostly not more than 3 mm long 20. E. PEREGRINA.

1b. Plants perennial.
9a. Panicle elongate, slender, dense, spikelike 6. E. SPICATA.
9b. Panicle open or contracted, not spikelike.
10a. Plants with stout scaly rhizomes 1. E. OBTUSIFLORA.
10b. Plants without rhizomes.
11a. Spikelets subsessile or nearly so, the lateral pedicels not more than 1 mm long.
Spikelets subsessile, distant along the few stout panicle branches
2. E. SESSILISPICA.
Spikelets short-pediceled.
Panicle large, becoming a tumble weed, the axis and branches viscid.
3. E. CURTIPEDICELLATA.
Panicle narrow (rarely open in *E. secundiflora*), not a tumble weed nor viscid; keels of palea forming a thick white band.
Lemmas 3 mm long, somewhat abruptly narrowed to the acute apex; panicle usually red-brown; anthers 0.2 to 0.3 mm long.
4. E. SECUNDIFLORA.
Lemmas 3.5 mm long, tapering to the acuminate apex; panicle pale or slightly pinkish; anthers 0.4 to 0.5 mm long.
5. E. BEYRICHII.
11b. Spikelets with pedicels more than 1 mm long (appressed along the branches in *E. refracta;* sometimes scarcely more than 1 mm long in *E. chariis* and *E. bahiensis*). Panicles large and open (sometimes condensed in *E. bahiensis*).
12a. Nerves of lemma obscure; lemma rounded on back, sometimes slightly keeled toward apex.
Axils of main panicle branches usually strongly pilose (rarely glabrous in *E. intermedia*).
Sheaths pilose or hirsute.
Culms mostly more than 50 cm tall; blades elongate, flat, not crowded at base of culm 30. E. HIRSUTA.
Culms mostly less than 50 cm tall; blades rather short and crowded at base of culm 32. E. TRICHOCOLEA.
Sheaths glabrous or nearly so, except the pilose summit.
Spikelets about 1 mm wide, 3- to 7-flowered, 3 to 5 mm long; lemmas 1.3 to 1.5 mm long 31. E. LUGENS.
Spikelets about 1.5 mm wide; 3- to 8-flowered, 3 to 10 mm long; lemmas 1.8 to 2 mm long 35. E. INTERMEDIA.
Axils of main panicle branches glabrous or the lower sparsely pilose.
Pedicels bearing above the middle a glandular band or spot; axils glabrous 36. E. SWALLENI.
Pedicels without glandular band; lower axils sparsely pilose to glabrous.
Lemmas about 3 mm long 33. E. EROSA.
Lemmas about 2 mm long 34. E. PALMERI.
12b. Nerves of lemma evident, usually prominent; lemmas keeled.
Spikelets approximate in a somewhat condensed panicle, or along the main branches of a somewhat spreading panicle; florets mostly 15 to 30.
Paleas readily deciduous 45. E. CHARIIS.
Paleas persistent 46. E. BAHIENSIS.
Spikelets in an open panicle.
Panicle longer than broad, the branches not horizontally spreading.
Culms not more than 60 cm tall.
Spikelets 9- to 15-flowered; panicle less than one-third the entire length of culm, the branches not viscid 37. E. TRACYI.
Spikelets 4- to 8-flowered; panicle more than half the entire length of culm, the branches viscid 38. E. SILVEANA.

Culms usually 1 m or more tall.
Spikelets mostly not more than 6-flowered, purplish.
39. E. TRICHODES.
Spikelets mostly 8- to 15-flowered, stramineous to bronze.
40. E. PILIFERA.
Panicle at maturity about as broad as long.
Panicle purple, the branches slender but rigid.
41. E. SPECTABILIS.
Panicle green to leaden, the branches capillary, fragile.
Spikelets appressed and distant along the nearly simple panicle branches---------- 44. E. REFRACTA.
Spikelets on long pedicels.
Lemmas 2 mm long---------- 42. E. ELLIOTTII.
Lemmas 3 mm long---------- 43. E. ACUTA.

FIGURE 269.—*Eragrostis obtusiflora*. Plant, × ½, two views of floret, × 10. (Toumey, Ariz.)

SECTION 1. CATACLÁSTOS Doell

Rachilla of spikelets disarticulating between the florets at maturity.

1. Eragrostis obtusiflóra Scribn. (Fig. 269.) Culms erect or ascending, firm, wiry, 30 to 50 cm tall, from stout creeping rhizomes with closely imbricate hard spiny-pointed scales; sheaths pubescent or pilose at the throat; blades firm, glaucous, flat, becoming involute at least toward the spiny-pointed tip, 5 to 10 cm long, 2 to 3 mm wide

at base; panicle 5 to 15 cm long, the rigid simple branches ascending, loosely flowered, 5 to 8 cm long; spikelets pale or purplish, 6- to 12-flowered, 8 to 12 mm long, the pedicels about 1 mm long; glumes acute, 3 and 5 mm long; lemmas rounded on the back, rather loosely imbricate, obtuse, somewhat lacerate, about 4 mm long. ♃ — Alkali soil, Arizona (Sulphur Springs Valley and Wilcox), New Mexico (Las Playas); Mexico.

Scribner[6] quotes Toumey as follows: "This species is one of the most abundant grasses in the extreme alkaline portions of Sulphur Springs Valley, where the large rootstocks in many places bind the shifting sands. It rarely flowers, and its superficial appearance,

FIGURE 270.—*Eragrostis sessilispica*. Panicle, × 1; floret, × 10. (Swallen 1791, Tex.)

without flowers, is much the same as our common salt grass (*Distichlis spicata*). It is a hard, rigid grass, but furnishes a large part of the forage of Sulphur Springs Valley, when other grasses are eaten off or are cut short by drought."

2. Eragrostis sessilispica Buckl. (Fig. 270.) Perennial; culms tufted, erect, 20 to 40 cm tall, with 1 node above the basal cluster of leaves; sheaths glabrous, strongly pilose at the throat; blades flat to rather loosely involute, 1 to 2 mm wide; panicle loose, open, pilose in the axils, at first about half the entire length of the culm, elongating toward maturity, the axis curving or loosely spiral, as much as 40 cm long, the distant branches stiffly spreading, 5 to 15 cm long, floriferous to base, sometimes bearing below a few secondary branches, the

[6] LAMSON-SCRIBNER, F. NEW OR LITTLE KNOWN GRASSES. U.S. Dept. Agr., Div. Agros. Bull. 8, pt. I: 5-11, illus. 1897. (See p. 10.)

whole panicle finally breaking away and tumbling before the wind; spikelets distant, nearly sessile, appressed, linear, 5- to 12-flowered, 8 to 12 mm long; glumes acute, about 3 mm long; lemmas loosely imbricate, acuminate, becoming somewhat indurate, 3 to 3.5 mm long, the lateral nerves prominent; palea prominently bowed out below. ♃ (*Acamptoclados sessilispica* Nash.)—Plains and sandy prairies, Kansas to Texas, New Mexico, and northern Mexico (fig. 271).

FIGURE 271.—Distribution of *Eragrostis sessilispica.*

3. Eragrostis curtipedicellâta Buckl. (Fig. 272.) Perennial; culms tufted, erect, 20 to 40 cm tall; sheaths pilose at the throat; blades flat or loosely involute, 1 to 3 mm wide; panicle open, spreading, at first 15 to 20 cm long, the axis and branches viscid, rather sparingly pilose in the axils, finally elongating, breaking away and tumbling

FIGURE 272.—*Eragrostis curtipedicellata.* Panicle, × 1; floret, × 10. (Ball 898, Tex.)

before the wind, the branches stiffly ascending or spreading; spikelets oblong or linear, short-pediceled, somewhat appressed on the primary and secondary branches, 6- to 12-flowered, 3 to 6 mm long; glumes about 1.5 mm long; lemmas rather closely imbricate, oblong, acute, about 1.5 mm long; palea ciliate on the keels, not bowed out; grain 0.7 mm long. ♃ —Plains, open woods, and dry slopes, southern Kansas to Texas and New Mexico (fig. 273).

FIGURE 273.—Distribution of *Eragrostis curtipedicellata.*

4. Eragrostis secundiflóra Presl. (Fig. 274.) Perennial; culms tufted, suberect, 20 to 40 cm tall; sheaths pilose at the throat; blades flat, more or less involute in drying, 1 to 4 mm wide, tapering to a

fine point; panicle condensed, more or less interrupted or with stiff ascending rather densely flowered branches, rarely somewhat open, 5 to 15 cm long, sometimes as much as 40 cm long, rarely sparsely pilose in the axils; spikelets usually red-brown, strongly compressed, subsessile, linear, mostly 10- to 40-flowered, 8 to 15 mm long; glumes acute, 1.5 and 2 mm long; lemmas closely imbricate, 3 mm long, somewhat abruptly narrowed to an acute apex, the tip slightly spreading; palea bowed out below, the keels prominent; anthers 0.2 to 0.3 mm long, gray; grain 1 mm long. ♃ —Sandy soil, northern Florida to Kansas and New Mexico, south to Oaxaca; also California (San Diego) (fig. 275).

FIGURE 275.—Distribution of *Eragrostis secundiflora*.

FIGURE 274.—*Eragrostis secundiflora*. Panicle, × 1; floret, × 10. (Reverchon 3501A, Tex.)

5. Eragrostis beyrichii J. G. Smith. (Fig. 276.) Resembling *E. secundiflora* and possibly only a variety of that species; differing in the softer foliage and panicle, the plant on the average smaller, the panicle pale or slightly pinkish; lemmas 3.5 to 4 mm long (the lower shorter), less firm, tapering to an acuminate apex; palea broader and longer; anthers 0.4 to 0.5 mm long, yellowish. ♃ —Sandy soil, Texas and Oklahoma (Wichita Mountains).

FIGURE 276.—*Eragrostis beyrichii*. Panicle, × 1; floret, × 10. (Tracy 7924, Tex.)

6. Eragrostis spicâta Vasey. (Fig. 277.) Perennial; culms tufted, erect, about 1 m tall; blades flat, elongate, more or less involute in drying, tapering to a slender point; panicle pale, slender, dense, spikelike, 10 to 30 cm long, 3 to 4 mm thick; spikelets strongly compressed, 2- or 3-flowered, 2 mm long, the somewhat pubescent pedicels less than 1 mm long; glumes rather broad, obtuse, unequal, the second about 1 mm long; lemmas about 2 mm long, all rising to about the same height, the lateral pair of nerves faint. ♃ —Dry ground, Laredo and Brownsville, Tex.; Baja California; Paraguay, Argentina.

FIGURE 277.—*Eragrostis spicata*. Panicle, × 1; spikelet, × 10. (Swallen 1086, Tex.)

7. Eragrostis ciliáris (L.) R. Br. (Fig. 278.) Annual; culms branching, erect to spreading, slender, wiry, 15 to 30 cm tall;

blades flat to subinvolute, mostly less than 10 cm long, 1 to 3 mm wide; panicle often purplish, condensed, interruptedly spikelike, 3 to 10 cm long, sometimes looser with stiffly ascending short branches; spikelets 6- to 12-flowered, 2 to 4 mm long; glumes about 1 mm long; lemmas oblong, 1 to 1.5 mm long, obtuse, the midnerve slightly excurrent;

FIGURE 278.—*Eragrostis ciliaris*. Plant ×; ½; spikelet, × 5; floret, × 10. (Nash 2104, Fla.)

keels of the palea conspicuously stiffly long-ciliate, the hairs 0.5 to 0.7 mm long; grain 0.5 mm long. ⊙ —Sandy shores, rocky soil, and open ground, Georgia to Florida and Mississippi; Texas; New Jersey (ballast); West Indies and Mexico to Brazil and Peru (fig. 279); Africa; Asia. Specimens with laxer panicles of more spreading

loosely flowered branches have been differentiated as *E. ciliaris* var. *laxa* Kuntze.

8. Eragrostis amábilis (L.) Wight and Arn. (Fig. 280.) Annual, resembling *E. ciliaris;* blades as much as 5 mm wide; panicle oblong or oblong-lanceolate, 2 to 4 cm wide, rather open; spikelets 4- to 8-flowered, about 2 mm long; glumes less than 1 mm long; lemmas ovate, obtuse, 1 mm long; keels of palea long-ciliate, the hairs about 0.3 mm long. ⊙ (*E. plumosa* Link.)—Gardens and waste places, Georgia and Florida; Texas; tropical America; apparently introduced from the Old World.

FIGURE 279.—Distribution of *Eragrostis ciliaris.*

FIGURE 280.—*Eragrostis amabilis.* Panicle, × ½; spikelet, × 10. (Meislahn 10, Fla.)

9. Eragrostis glomeráta (Walt.) L. H. Dewey. (Fig. 281.) Annual; culms erect, 20 to 100 cm tall, branching below, the branches erect; blades flat, 3 to 8 mm wide, tapering to a fine point; panicle narrow, erect, densely flowered, somewhat interrupted, 5 to 50 cm long, greenish or tawny, the branches ascending or appressed, floriferous to base, many-flowered; spikelets short-pediceled, mostly 6- to 8-flowered, 2 to 3 mm long; glumes minute; lemmas very thin, about 1 mm long; grain about 0.3 to 0.4 mm long. ⊙ (*E. conferta* Trin.)—Banks of ponds and streams, and low ground, South Carolina to Florida, Arkansas, and eastern Texas, south through Mexico and West Indies to Uruguay (fig. 282).

FIGURE 282.—Distribution of *Eragrostis glomerata.*

FIGURE 281.—*Eragrostis glomerata.* Panicle, × ½; spikelet and floret, × 10. (Eggert, Ark.)

SECTION 2. PTEROÉSSA Doell

Rachilla of spikelet continuous, not disarticulating at maturity; palea usually persistent for a short time after the fall of the lemma (sometimes falling with it in *E. unioloides* and *E. chariis*).

10. Eragrostis réptans (Michx.) Nees. (Fig. 283.) Annual, dioecious; culms branching, creeping, rooting at the nodes, forming mats; blades flat, usually pubescent, mostly 1 to 3 cm long; panicles numerous, ovoid, usually rather dense or capitate, few- to several-

FIGURE 283.—*Eragrostis reptans.* Pistillate (♀) and staminate (♂) plants, × ½; floret, × 10. (Bush 1306 (♀) and 1307 (♂), Tex.)

flowered, rarely many-flowered, mostly 1 to 2 cm long; spikelets several- to many-flowered, linear, at length elongate and more or less curved; lemmas closely imbricate, often sparsely villous, acuminate, about 3 mm long; palea of pistillate floret about half as long as the lemma, of the staminate floret as long as the lemma; grain ovoid, about 0.5 mm long; anthers before dehiscing, 1.5 to 2 mm long. ⊙ (*E. capitata* Nash.)—River banks, sandy land, and open ground, Kentucky to South Dakota and Texas (fig. 284).

FIGURE 284.—Distribution of *Eragrostis reptans.*

11. Eragrostis hypnoídes (Lam.) B. S. P. (Fig. 285.) Annual, branching, creeping, and matlike as in the preceding; blades scabrous or pubescent on the upper surface; panicles elliptic, loosely few-flowered, 1 to 5 cm long, sometimes somewhat capitate; spikelets several- to many-flowered, linear, mostly 5 to 10 mm long, sometimes as much as 2 cm long in a dense cluster; flowers perfect; lemmas glabrous, acute, 1.5 to 2 mm long; palea about half as long as the lemma; grain 0.5 mm long; anthers about 0.2 mm long. ⊙ —Sandy river banks and wet ground, Quebec to Washington, south through Mexico and the West Indies to Argentina; not found in the Rocky Mountains (fig. 286).

12. Eragrostis símplex Scribn. (Fig. 287.) Annual; culms spreading to suberect, 10 to 30 cm tall; blades flat, 1 to 3 mm wide; panicle narrow, 5 to 20 cm long, the main axis often curved, the branches

solitary, distant, ascending or spreading, sometimes reflexed, floriferous to base, short, with a few crowded spikelets or as much as 5 cm long, with short branchlets; spikelets nearly sessile, linear, mostly 20- to 50-flowered, 5 to 20 mm long; lemmas closely imbricate, ovate, acute, 1.5 to 2 mm long, the lateral nerves near the margin; grain about 0.5 mm long anthers about 0.1 mm long. ⊙ —Sandy woods, dooryards, and waste places, southern Georgia and Florida.

FIGURE 285.—*Eragrostis hypnoides.* Plant, × ½; florets, × 10. (Mearns 741, Minn.)

13. Eragrostis unioloídes (Retz.) Nees. (Fig. 288.) Annual; culms erect or ascending, 20 to 40 cm tall; blades flat, 2 to 4 mm wide; panicle elliptic, open, 10 to 15 cm long, about half as wide, the branches ascending; spikelets ovate-oblong, strongly compressed, truncate at base, obtuse, 15- to 30-flowered, 5 to 10 mm long, 3 mm wide, often pink or purplish; lemmas closely imbricate, nearly horizontally spreading, strongly keeled, acute, 2 mm long, the lateral nerves prominent; palea falling with the lemma or soon thereafter; grain about 0.7 mm long. ⊙ —Waste ground, Georgia and Florida; introduced from southern Asia.

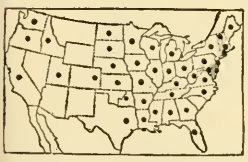

FIGURE 286.—Distribution of *Eragrostis hypnoides.*

14. Eragrostis capilláris (L.) Nees. LACEGRASS. (Fig. 289.) Annual; culms erect, 20 to 50 cm tall, much-branched at base, the branches erect; sheaths pilose, at least on the margin, long-pilose at the throat; blades flat, erect, pilose on upper surface near the base, 1 to 3 mm wide; panicle oblong or elliptic, open,

diffuse, usually two-thirds the entire height of the plant, the branches and branchlets capillary; spikelets long-pediceled, 2- to 4-flowered, 2 to 3 mm long; glumes acute, 1 mm long; lemmas acute, about 1.5 mm long, obscurely nerved, rounded on the back, minutely scabrous toward the tip; grain 0.5 mm long, somewhat roughened. ⊙ —Dry open ground, open woods, and fields, Maine to Wisconsin, south to Georgia, Kansas, and eastern Texas (fig. 290).

FIGURE 287.—*Eragrostis simplex*. Panicle, × ½; floret, × 10. (Curtiss, Fla.)

15. Eragrostis fránkii C. A. Meyer. (Fig. 291.) Resembling *E. capillaris;* culms usually lower, spreading to erect; sheaths glabrous except the pilose throat; blades glabrous; panicle less than half the entire height of the plant, open but not diffuse, mostly less than half as wide as long, the branches ascending, the shorter pedicels not much longer than the spikelets; spikelets 3- to 5-flowered, 2 to 3 mm long. ⊙ —Sandbars, river banks, and moist open ground, New Hampshire to Minnesota, south to Florida and Kansas (fig. 292). ERAGROSTIS FRANKII var. BRÉVIPES Fassett. Spikelets 5- to 7-flowered, 3 to 4 mm long. ⊙ —Wisconsin (Glenhaven), and Illinois.

FIGURE 288.—*Eragrostis unioloides*. Spikelet, × 10. (Curtiss 6898, Fla.)

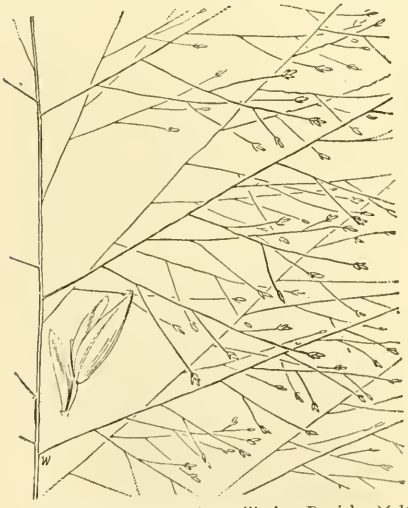

FIGURE 289.—*Eragrostis capillaris*. Panicle, × 1; floret, × 10. (Dewey 35, D.C.)

16. Eragrostis pilósa (L.) Beauv. INDIA LOVEGRASS. (Fig. 293.) Weedy annual; culms slender, erect or ascending from a decumbent base, 10 to 50 cm tall; blades flat, 1 to 3 mm wide; panicle delicate, open, becoming somewhat diffuse, 5 to 20 cm long, the branches capillary, flexuous, ascending or spreading, finally somewhat implicate, the lower fascicled, sparsely long-pilose in the

FIGURE 290.—Distribution of *Eragrostis capillaris*.

axils; spikelets gray to nearly black, linear, scarcely compressed, 3- to 9-flowered, 3 to 5 mm long, about 1 mm wide, the pedicels spreading, mostly longer than the spikelets; glumes acute, the first a little less than, the second a little more than, 1 mm long; lemmas loosely imbricate, the rachilla more or less exposed, rounded on the back, acute, 1.2 to 1.5 mm long, 0.5 mm wide from keel to margin, the nerves obscure; grain 0.6 mm long. ⊙ —Moist open ground and waste places, Massachusetts to Colorado, south to Florida and Texas, south through Mexico and West Indies to Argentina; California (fig. 294); introduced from Europe.

FIGURE 291.—*Eragrostis frankii.* Panicle, × 1; floret, × 10. (Chase 2005, Ill.)

Eragrostis viréscens Presl. Annual; culms slender, 50 to 60 cm tall; blades 3 to 6 mm wide; panicle open, about one third the entire height of the culm, the lower branches mostly solitary, the axils glabrous or nearly so; branchlets and spikelets somewhat appressed along the primary branches; spikelets linear, mostly 7- to 9-flowered, 4 to 5 mm long, pale or greenish, about 1 mm wide; lower lemmas scarcely 1.5 mm long. ⊙ —Ballast, Apalachicola, Florida; Chile. Resembling *E. diffusa;* spikelets smaller.

FIGURE 292.—Distribution of *Eragrostis frankii.*

17. Eragrostis pectinácea (Michx.) Nees. (Fig. 295.) Resembling *E. pilosa;* panicles less delicate, the axils glabrous or obscurely pilose, the somewhat larger spikelets appressed along the branches and branchlets, often longer than the pedicels; spikelets at maturity mostly linear, 5 to 8 mm long; lemmas 1.5 to 1.6 mm long, the rachilla not or scarcely exposed, the nerves evident; grain 0.8 mm long. ⊙ (*E. caroliniana* (Spreng.) Scribn.; *E. purshii* Schrad.)—Fields, waste places, open ground, moist places, Maine to North Dakota, south to Florida and eastern Texas, rare in the Western States (fig. 296). The name *E. pectinacea* has been misapplied to *E. spectabilis.*

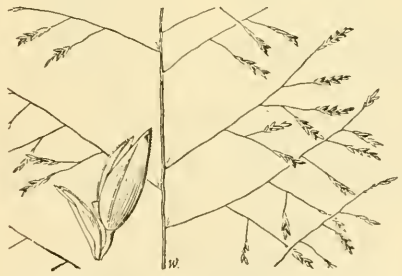

FIGURE 293.—*Eragrostis pilosa.* Panicle, × 1; floret and palea, × 10. (Ruth 514, Tex.)

FIGURE 294.—Distribution of *Eragrostis pilosa.*

18. Eragrostis diffúsa Buckl. (Fig. 297.) More robust than *E. pectinacea,* usually 30 to 50 cm tall, sometimes taller; panicle larger, the primary branches bearing appressed secondary branches with few to several spikelets, the main panicle branches thus more

densely flowered. ⊙ —A common weed in fields and open ground, Oklahoma and Texas to Nevada and southern California; introduced in Missouri, South Carolina, Alabama, and Louisiana; Mexico (fig. 298). In some specimens the spikelets are ascending rather than appressed, thus making the panicle more open.

FIGURE 295.—*Eragrostis pectinacea.* Panicle, × 1; floret, × 10. (V. H. Chase 84, Ill.)

19. Eragrostis tephrosánthos Schult. (Fig. 299.) Annual, rather soft and lax; culms branching at base, erect to decumbent-spreading, 5 to 20 cm tall, sometimes taller; blades flat, usually 5 to 10 cm long, 1 to 2 mm wide; panicle open, mostly 4 to 10 cm long, about half as wide, the branches ascending or spreading, naked below, the spikelets appressed or ascending along the upper part, the lower axils pilose; spikelets 6- to 12-flowered, 4 to 7 mm long, about 1.5 mm wide; glumes about 1 and 1.3 mm long; lemmas 1.5 to 2 mm long, the lateral nerves distinct. ⊙ —Open ground, fields, and waste places, Florida to south-

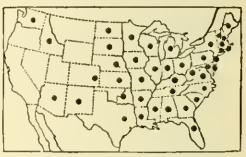

FIGURE 296.—Distribution of *Eragrostis pectinacea.*

FIGURE 297.—*Eragrostis diffusa.* Panicle, × 1; floret, × 10. (Reverchon 1614, Tex.)

ern Texas and south through the lowland tropics to Brazil (fig. 300).

20. Eragrostis peregrína Wiegand. (Fig. 301.) Annual; re-

FIGURE 298.—Distribution of *Eragrostis diffusa.*

FIGURE 299.—*Eragrostis tephrosanthos.* Panicle, × 1; floret, × 10. (Curtiss 5930, Fla.)

sembling *E. tephrosanthos* but the axils of the panicle glabrous; panicle branches spikelet-bearing nearly to base; spikelets mostly

4- to 8-flowered, mostly 3 to 4 mm long. ⊙ —Waste places, Maine to Michigan, south to Pennsylvania and Maryland: ballast, Portland, Oreg. (fig. 302); introduced from Europe.

FIGURE 300.—Distribution of *Eragrostis tephrosanthos.*

FIGURE 301.—*Eragrostis peregrina.* Panicle, × 1; floret, × 10. (Hotchkiss 1708, N.Y.)

FIGURE 302.—Distribution of *Eragrostis peregrina.*

21. Eragrostis orcuttiána Vasey. (Fig. 303.) Annual; culms ascending from a decumbent base, rather stout, 60 to 100 cm tall; blades flat, 2 to 6 mm wide; panicle open, 15 to 30 cm long, the

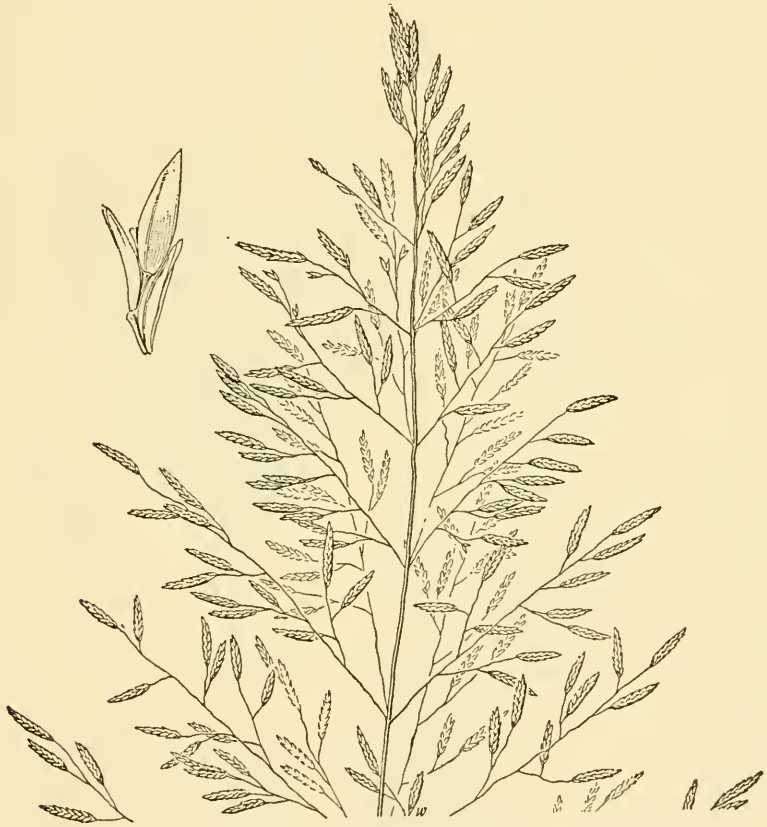

FIGURE 303.—*Eragrostis orcuttiana.* Panicle, × 1; floret, × 10. (Hitchcock 3063, Calif.)

branches, branchlets, and pedicels slender, spreading, flexuous, finally implicate, the axils glabrous; spikelets linear, 6- to 10-flowered, sometimes a little falcate, 5 to 7 mm long, about 1 mm wide; second glume a little more than 1 mm long; lemmas loosely imbricate, the

rachilla often exposed, narrow, acutish, the lower 1.8 mm long; grain 0.8 mm long. ⊙ —Fields, waste places, and sandy river banks, Oregon (ballast, Portland) and Nevada to Arizona and California (fig. 304).

FIGURE 304.—Distribution of *Eragrostis orcuttiana.*

22. Eragrostis lutéscens Scribn. (Fig. 305.) Annual; culms freely branching at base, erect or ascending, 5 to 20 cm tall; sheaths and blades with numerous glandular depressions; blades flat; panicles numerous, narrow, erect, pale or yellowish green, 2 to 10 cm long, the branches ascending or appressed, beset with glandular depressions; spikelets 6- to 10-flowered, 5 to 7 mm long, compressed; glumes acute, 1.5 and 2 mm long; lemmas about 2 mm long, acute, the nerves prominent; palea 1.5 mm long. ⊙ —Sandy shores, Idaho to Washington, south to Arizona and California (fig. 306).

FIGURE 305.—*Eragrostis lutescens.* Plant, × ½; floret, × 10. (Type.)

23. Eragrostis cilianénsis (All.) Link. STINKGRASS. (Fig. 307.) Weedy annual with disagreeable odor when fresh; culms ascending or spreading, 10 to 50 cm tall, with a ring of glands below the nodes; foliage sparsely beset with glandular depressions, the sheaths pilose at the throat; blades flat, 2 to 7 mm wide; panicle erect, dark gray-green to tawny, usually rather condensed, sometimes, especially in the Southwest, open, 5 to 20 cm long, the branches ascending; spikelets oblong, compressed, 10- to 40-flowered, 5 to 15 mm long, 2.5 to 3 mm wide; lemmas in side view ovate, acutish, about 2.5 mm long, 1 mm wide from keel to margin, the keel scabrous toward apex and beset with a few glands, the lateral nerves prominent; palea about two-thirds as long as the lemma, minutely ciliate on the keels; grain ovoid, plump, 0.7 mm long; anthers 0.5 mm long. ⊙ (*E. major* Host; *E. megastachya* Link.)—Cultivated ground, fields, and waste places, Maine to Washington, south throughout the United States, sparingly in the Northwest, absent from the higher mountains; Mexico and West Indies, south to Argentina; introduced from the Old World.

FIGURE 306.—Distribution of *Eragrostis lutescens.*

FIGURE 307.—*Eragrostis cilianensis*. Plant, × ½; spikelet, × 5; floret, × 10. (Schuette 155, Wis.)

24. Eragrostis poaeoídes Beauv. (Fig. 308.) Annual; resembling *E. cilianensis*, mostly more slender; panicles rather more open, the spikelets smaller, 1.5 to 2 mm wide, the lemmas about 2 mm long, the glands sometimes obscure; anthers about 0.2 mm long. ⊙ (*E. minor* Host; *E. eragrostis* Beauv.)—Waste places, sparingly introduced from Europe, Vermont to Iowa, south to Georgia and Texas; Arizona and California (fig. 309).

FIGURE 308.—*Eragrostis poaeoides*. Panicle, × 1; floret, × 10. (Dutton 2235, Vt.)

25. Eragrostis barreliéri Daveau. (Fig. 310.) Annual; culms erect or decumbent at base, 20 to 50 cm tall, branching at base, sometimes with a glandular band below the nodes; sheaths pilose at the summit; blades flat, rather short, 2 to 4 mm wide; panicle erect, open but narrow, 8 to 15 cm long, the branches ascending or stiffly spreading, few-flowered, spikelet-bearing nearly to base, the axils glabrous; spikelets linear, usually 12- to 15-flowered, mostly about 1 cm long, and 1.5 mm wide; lemmas 2 mm long or slightly longer. ⊙ —Waste places, Kansas, Texas; Arizona (Tombstone); California (Fresno); introduced from southern Europe.

FIGURE 309.—Distribution of *Eragrostis poaeoides*.

26. Eragrostis neomexicána Vasey. (Fig. 311.) Annual; culms usually rather stout, often widely spreading, as much as 1 m tall; sheaths glabrous, pilose at the throat, often with glandular depressions along the keel or nerves; blades flat, often elongate, 5 to 10 mm wide; panicle 20 to 40 cm long, smaller in depauperate specimens, open, the branches ascending or spreading but not divaricate, the branchlets at first appressed along the main branches, finally usually spreading, the axils glabrous; spikelets mostly dark grayish green, ovate to ovate-oblong, or rarely linear, mostly 8- to 12-flowered, 5 to 8 mm long, about 2 mm wide; lemmas 2 to 2.3 mm long. ⊙ —Fields, waste places, and wet ground, Texas to southern California, south through Mexico; introduced in Maryland, Indiana, Iowa, and Missouri (fig. 312).

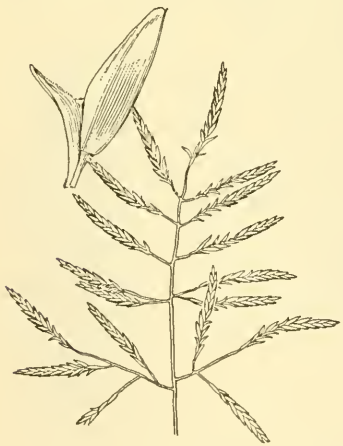

FIGURE 310.—*Eragrostis barrelieri*. Panicle, × 1; floret, × 10. (Hitchcock 5280, Tex.)

27. Eragrostis mexicána (Hornem.) Link. MEXICAN LOVEGRASS. (Fig. 313.) Resembling *E. neomexicana*, but lower, erect or spreading, often simple; panicle erect, comparatively small and few-flowered, less compound, the branches and pedicels

spreading; spikelets usually not more than 7-flowered. ⊙ —Open ground, Texas to Arizona; introduced in Delaware and Iowa.

28. Eragrostis suavéolens Becker. (Fig. 314.) Annual culms spreading, 20 to 50 cm tall, a ring of glands below the nodes; sheaths with numerous small glandular depressions on the nerves; blades flat, sparsely long-pilose, 2 to 3 mm wide; panicles open, less than half the entire height of the culm, 10 to 15 cm or more long, the branches and pedicels spreading, the axils glabrous, the branchlets and pedicels bearing near the summit a glandular depression; spikelets linear-oblong, 5 to 7 mm long,

FIGURE 312.—Distribution of *Eragrostis neomexicana.*

mostly 7- to 9-flowered, rather soft; lemmas keeled, the lower about 2 mm long, the lateral nerves distinct. ⊙ —Introduced in the vicinity of Las Cruces, N.Mex.; southern Russia.

FIGURE 311.—*Eragrostis neomexicana.* Panicle, × 1; floret, × 10. (Type.)

29. Eragrostis árida Hitchc. (Fig. 315.) Annual; culms branching at base, erect or more or less decumbent at base, 20 to 40 cm tall; sheaths not glandular, the hairs at summit in a dense line part way along the collar; blades mostly flat, glabrous, tapering to a fine point, mostly 4 to 8 cm long, 1 to 2 mm wide; panicle mostly one-third to half the entire length of the plant, open,

FIGURE 313.—*Eragrostis mexicana.* Panicle, × 1; floret, × 10. (Smith, N.Mex.)

the branches, branchlets, and pedicels flexuous, spreading, the lower axils sparsely pilose, the branches solitary or the lower in pairs; spikelets oblong to linear, stramineous or drab, mostly 8- to 15-flowered, 5 to 10 mm long, 1.5 to 2 mm wide, somewhat compressed,

the lateral pedicels 2 to 3 mm long; glumes acute, the first narrow, scarcely 1 mm long, the second a little longer and wider; lemmas 1.6 to 1.8 mm long, acutish. ⊙ —Dry soil, Arkansas and Texas to Arizona and central Mexico.

FIGURE 314.—*Eragrostis suaveolens*, × 10. (Hitchcock 3812, N. Mex.)

30. Eragrostis hirsúta (Michx.) Nees. (Fig. 316.) Perennial; culms erect, tufted, 50 to 120 cm tall; sheaths hirsute to glabrous, pilose at the throat and especially along the collar at each side; blades flat, elongate, 5 to 10 mm wide, becoming more or less involute, tapering to a fine point, scabrous on the upper surface; panicle diffuse, more than half the entire height of the plant, pilose in the axils, branching 4 or 5 times; spikelets on long flexuous pedicels, ovate to ovate-oblong, 2- to 6-flowered (rarely to 8-flowered), 3 to 4 mm long; glumes acuminate, 1.5 and 2 mm long; lemmas rather turgid, 2 mm long, acute, the nerves obscure; grain oblong, 1 mm long, minutely striate and pitted. ♃ —Dry soil, fields and open woods, Maryland to Missouri, south to Florida and eastern Texas; introduced in Maine and Massachusetts (fig. 317).

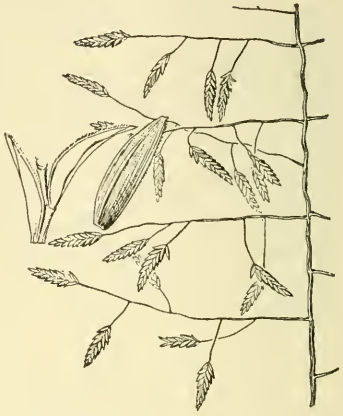

FIGURE 315.—*Eragrostis arida*. Panicle, × 1; floret, × 10. (Type.)

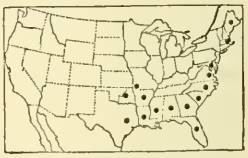

FIGURE 317.—Distribution of *Eragrostis hirsuta*.

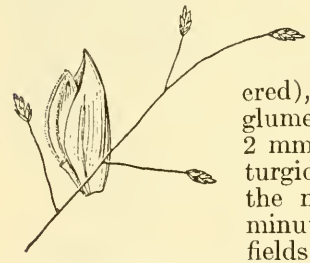

FIGURE 316.—*Eragrostis hirsuta*. Panicle, × 1; floret, × 10. (Curtiss 3499, Fla.)

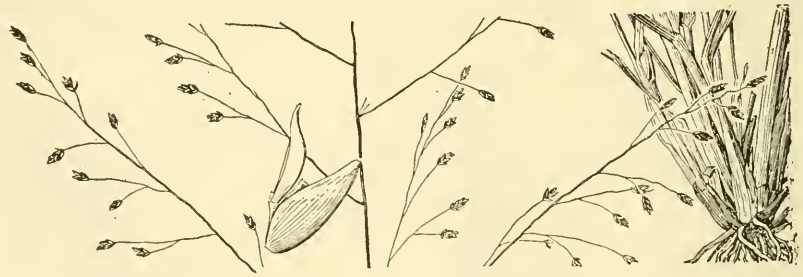

FIGURE 318.—*Eragrostis lugens*. Plant, × 1; floret, × 10. (Reverchon 16, Tex.)

31. Eragrostis lúgens Nees. (Fig. 318.) Perennial; culms tufted, rather wiry, sometimes geniculate below, sparingly branching; sheaths

pilose in the throat, sometimes along the margin and on sides at summit; blades subinvolute, 10 to 25 cm long, 1.5 to 3 mm wide, pilose on the upper surface toward base, rarely beneath; panicle rather diffuse, 15 to 30 cm long, about two-thirds as wide, the axis and ascending to spreading branches capillary, flexuous, the lower branches in pairs or verticils, the axils except upper, conspicuously long pilose; spikelets on long pedicels, mostly glossy drab, 3- to 7-flowered, 3 to 5 mm long, 1 to 1.2 mm wide; glumes thin, 0.7 and 1.2 mm long, falling early; lemmas closely imbricate, 1.3 to 1.5 mm long, abruptly acute; grain about 0.7 mm long. ♃ —Dry prairie, Texas; also on ballast, Mobile, Alabama; Venezuela to Argentina.

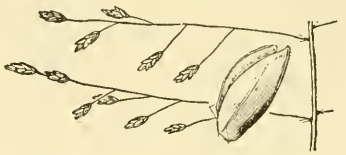

FIGURE 319.—*Eragrostis trichocolea*. Panicle, × 1; floret, × 10. (Curtiss, Fla.)

32. Eragrostis trichocólea Hack. and Arech. (Fig. 319.) Perennial; culms erect, 30 to 60 cm tall, the leaves rather short, mostly crowded at the base; sheaths, at least the lower, spreading, pilose; blades spreading, flat or, especially on the innovations, involute, mostly 8 to 12 cm long, 2 to 4 mm wide, pilose; panicle diffuse, 15 to 20 cm long, nearly or quite as wide, the branches

FIGURE 320.—*Eragrostis erosa*. Panicle, × 1. (Skehan 58, N.Mex.); floret, × 10. (Type.)

stiffly and widely spreading, pilose in the axils; pedicels 2 or 3 times as long as the spikelets; spikelets 3- to 5-flowered, 3 to 4 mm long, about 1.5 mm wide; glumes 1 to 1.2 and 1.3 to 1.5 mm long; lemmas about 1.5 mm long. ♃ —Sandy woods, Florida (Tampa, Lakeland); Mexico to Uruguay.

33. Eragrostis erósa Scribn. (Fig. 320.) Perennial; culms tufted, erect, 50 to 90 cm tall; blades mostly involute; panicle diffuse, less than half the entire height of the plant, usually about one-third,

mostly more than half as wide as long, branching 2 or 3 times, sparsely pilose or glabrous in the axils; spikelets mostly 8- to 9-flowered, 5 to 10 mm long, 1.8 to 2 mm wide; lemmas 2.5 to 3 mm long, hyaline-margined toward summit, the tip erose. ♃ —Rocky hills, western Texas to New Mexico and northern Mexico.

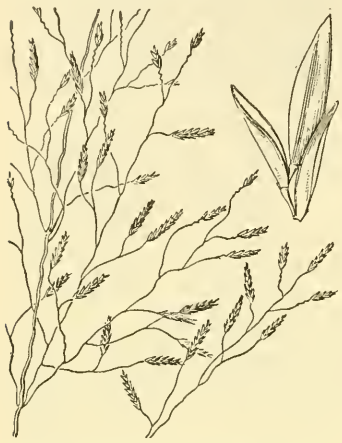

FIGURE 321.—*Eragrostis palmeri.* Panicle, × 1; floret, × 10. (Silveus 851, Tex.)

34. Eragrostis palméri S. Wats. (Fig. 321.) Perennial; culms tufted, erect, about 70 cm tall; blades involute, elongate, erect; panicle open, oblong, 15 to 20 cm long, 5 to 7 cm wide, glabrous in the axils; spikelets 5 to 7 mm long, mostly 7- to 9-flowered, brownish; first glume about 1 mm long; second glume 1.5 to 2 mm long; lemmas rounded on the back, bronze-tipped, about 2 mm long. ♃ —Alkaline banks, Texas (Harlingen); Mexico (Juárez, Coahuila). Differs from *E. erosa* in the oblong panicle and smaller spikelets and lemmas.

35. Eragrostis intermédia Hitchc. PLAINS LOVEGRASS. (Fig. 322.) Perennial; culms erect, tufted, mostly 40 to 80 cm tall; sheaths glabrous or the lowermost sparsely pilose, conspicuously pilose at the throat, the hairs extending in a line across the collar; blades flat to subinvolute, pilose on the upper surface near the base, otherwise glabrous or with a few scattered hairs, 10 to 25 cm long, 1 to 3 mm wide; panicle erect, open, often diffuse, 15 to 35 cm long,

FIGURE 322.—*Eragrostis intermedia.* Panicle, × 1; floret, × 10. (Type.)

at maturity mostly about three-fourths as wide, the axils pilose, sometimes sparsely so or rarely glabrous, the branches slender but rather stiff, the lower in pairs or verticils, all spreading, often horizontal; spikelets usually 3- to 8-flowered, 3 to 10 mm long, about 1.5 mm wide, grayish or brownish green, the pedicels somewhat flexuous, 1 to

3 times as long as the spikelet; glumes acute, 1 to 1.2 and 1.2 to 1.4 mm long; lemmas turgid, obscurely nerved, 1.8 to 2 mm long, usually bronze-tipped, not hyaline margined; grain oblong, about 0.7 mm long. ♃ —Dry or sandy prairies, Georgia; Louisiana and Missouri to southern California and south to Central America (fig. 323). A few specimens from New Mexico have long spikelets (as much as 13-flowered) and glabrous axils.

36. Eragrostis swallēni Hitchc. (Fig. 324.) Perennial; culms in dense tufts, erect, 20 to 50 cm tall, an obscure glandular band below the nodes; sheaths sparingly pilose at the throat; blades involute, glabrous, arching-recurved, 10 to 30 cm long; panicle erect, open, 10 to 20 cm long, the branches ascending or spreading, glabrous, stiffly flexuous; spikelets oblong to linear, stramineous or grayish-green, 7 to 10 mm long, about 2 mm wide, mostly 8- to 12-flowered, the slender pedicels bearing above the middle a glandular band or spot; glumes acutish, rather broad, about 1.2 and 1.8 mm long; lemmas rather closely imbricate, acutish, about 2 mm long; palea minutely scabrous on the keels; grain nearly smooth, slightly narrowed toward the summit, 1 mm long. ♃ — Sandy prairies, southern Texas. Known only from Sarita and nearby Riviera.

FIGURE 323.—Distribution of *Eragrostis intermedia.*

37. Eragrostis trácyi Hitchc. (Fig. 325.) Apparently perennial; culms erect, tufted, 30 to 80 cm tall; sheaths rather sparsely pilose

FIGURE 324.—*Eragrostis swalleni.* Plant and panicle, × 1; floret, × 10. (Type.)

at the throat; blades flat or, especially of the innovations, involute, 5 to 25 cm long, 1 to 3 mm wide; panicle erect, open, 10 to 15 cm long, 5 to 8 cm wide, the axils glabrous or nearly so, the branches ascending to spreading, flexuous; spikelets linear, mostly 9- to 15-flowered, 5 to 10 mm long, about 1.5 mm wide, pinkish or purplish, the flexuous pedicels spreading, 2 to 5 mm long; glumes acutish, about 1 mm and 1.5 mm long; lemmas 1.5 to 2 mm long, rather soft, loosely imbricate, the lateral nerves distinct; palea somewhat persistent; grain about 0.7 mm long. ♃ —Sandy soil, known only from Sanibel Island, Fla.

38. Eragrostis silveána Swallen. (Fig. 326.) Perennial; culms densely tufted, erect from a knotty base, 40 to 50 cm tall; sheaths

FIGURE 325.—*Eragrostis tracyi.* Panicle, × 1; floret, × 10. (Type.)

glabrous; blades flat or loosely involute in drying, elongate, 3 mm wide, attenuate to a fine point, glabrous; panicle 25 to 35 cm long,

FIGURE 326.—*Eragrostis silveana.* Panicle, × 1; spikelet, × 10. (Type.)

10 to 15 cm wide, the viscid scabrous branches stiffly ascending or spreading, naked at base, sparsely pilose in the axils; spikelets pur-

plish, 4- to 8-flowered, 2.5 to 4 mm long, the ultimate pedicels short, usually appressed; glumes about 1 mm long; lemmas acute, about 1.3 mm long, the lateral nerves prominent. ♃ —Open ground, southern Texas.

39. Eragrostis trichódes (Nutt.) Nash. (Fig. 327.) Perennial; culms tufted, erect, 60 to 120 cm tall; sheaths pilose at the summit,

FIGURE 327.—*Eragrostis trichodes.* Panicle, × 1; floret, × 10. (Reverchon, Tex.)

sometimes on the upper half; blades flat to subinvolute, elongate, 2 to 6 mm wide, tapering to a slender point, scabrous on the upper surface; panicle usually purplish, diffuse, oblong, usually about half the entire height of the culm, branching 3 or 4 times, the branches capillary, loosely ascending, sparsely pilose in the axils; spikelets long-pediceled, lanceolate to ovate-oblong, mostly 4- to 6-flowered, 4 to 7 mm long; glumes acuminate, nearly equal, 2.5 to 3 mm long, about as long as the first floret; lemmas 2.5 to 3 mm long, acute, subcompressed, the keel and lateral nerves strong; grain 1 mm long, minutely pitted; anthers a little more than 1 mm long. ♃ — Sand barrens and open sandy woods, Illinois and Nebraska to Texas (fig. 328).

FIGURE 328.—Distribution of *Eragrostis trichodes.*

40. Eragrostis pilífera Scheele. (Fig. 329.) Resembling *E. trichodes*, often in smaller tufts and taller; panicle stramineous or golden-bronze; spikelets linear, 8- to 15-flowered, 8 to 12 mm long; glumes and lemmas about 3 mm long. ♃ (*E. grandiflora* Smith and Bush.)—Sand hills and sand barrens, Illinois and Nebraska to Texas (fig. 330). Probably only a variety of *E. trichodes.*

41. Eragrostis spectábilis (Pursh) Steud. PURPLE LOVEGRASS. (Fig. 331.) Perennial; culms in dense tufts, stiffly erect to spreading, 20 to 60 cm tall; sheaths glabrous or pilose, conspicuously hairy at the throat; blades flat or folded, rather firm, stiffly ascending, tapering to a fine point, glabrous or rarely pilose, mostly 3 to 8 mm wide; panicle at first included at base, two thirds the entire height of the culm, diffuse, bright purple, rarely pale, branching 3 or 4 times, the axis stiff, the branches stiffly spreading toward maturity, rarely pilose,

strongly pilose in the axils, the lower shorter than the middle ones, finally reflexed, the whole panicle finally breaking away and tumbling before the wind; spikelets long-pediceled, short-pediceled toward the ends of the branches, oblong to linear, 6- to 12-flowered, 4 to 8 mm long; glumes acute, a little more than 1 mm long; lemmas acute, about 1.5 mm long, slightly scabrous toward the tip, the lateral nerves prominent toward the base; palea somewhat bowed out, exposing the rather prominently short-ciliate keels; grain oval, dark-brown, 0.6

FIGURE 329.—*Eragrostis pilifera.* Panicle, × 1; floret, × 10. (Rydberg 1831, Nebr.)

mm long. ♃ —Sandy soil, Maine to Minnesota, south to Florida, Kansas, Colorado, and Arizona; Mexico (San Luis Potosí) (fig. 332). This species has been generally referred to *E. pectinacea.*

42. Eragrostis elliŏttii S. Wats. (Fig. 333.) Perennial; culms tufted, stiffly erect or spreading, 40 to 80 cm tall; sheaths glabrous, pilose at the throat; blades flat, elongate, scabrous on the upper surface, 2 to 4 mm wide; panicle diffuse, fragile, usually more than half the entire height of the plant, branching 3 or 4 times, the branches capillary, spreading; spikelets on long capillary spreading pedicels, linear, mostly 8- to 15-flowered, 5 to 12 mm long, about 2 mm wide, pale or gray; glumes acute, 1 and 1.5 mm long; lemmas closely imbricate, acute, about 2 mm long, bowed out below, fitting into the angles of the zigzag rachilla; grain oval, 0.7 mm long. ♃ —Low ground, wet meadows, and low pine woods, Coastal Plain, North Carolina to Florida and eastern Texas; West Indies and eastern Mexico (fig. 334).

FIGURE 330.—Distribution of *Eragrostis pilifera.*

43. Eragrostis acúta Hitchc. (Fig. 335.) Perennial; culms erect, 40 to 60 cm tall; sheaths glabrous, pilose at the throat; blades flat, becoming more or less involute, 2 to 4 mm wide; panicle diffuse, more than half the entire height of the plant, branching 3 or 4 times, the branches less fragile than in *E. elliottii;* spikelets on long spreading pedicels, oblong-elliptic, 10- to 20-flowered, 8 to 14 mm long, 3 mm wide, pale or stramineous; glumes acuminate, 2.5 and 3 mm long; lemmas acuminate, 3 mm long; grain 0.8 mm long. ♃ —Low pine woods and moist sandy soil, peninsular Florida

FIGURE 331.—*Eragrostis spectabilis.* Plant, × ½; spikelet, × 5; floret, × 10. (Hitchcock 7849, Md.)

44. Eragrostis refrácta (Muhl.) Scribn. (Fig. 336.) Resembling *E. elliottii;* blades more or less pilose on the upper surface near base; lower panicle branches usually finally reflexed, long-pilose in the axils; spikelets short-pedicelled, appressed and distant along the nearly simple panicle branches, the lemmas on the average shorter than in *E. elliottii.* 2↓ —Low sandy soil, Coastal Plain, Delaware to Florida and eastern Texas (fig. 337).

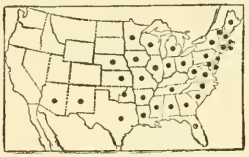

FIGURE 332.—Distribution of *Eragrostis spectabilis.*

45. Eragrostis cháriis (Schult.) Hitchc. (Fig. 338, *B.*) Perennial; culms erect or ascending at base, 60 to 120 cm tall; panicle open, 7 to 15 cm long, nodding, the branches glabrous or with a few hairs in the axils, ascending, solitary, rather distant, naked below, rather closely flowered with ascending or appressed branchlets; spikelets linear, 5 to 10 mm long, 8- to 20-flowered; glumes about 1.3 and 1.7 mm long;

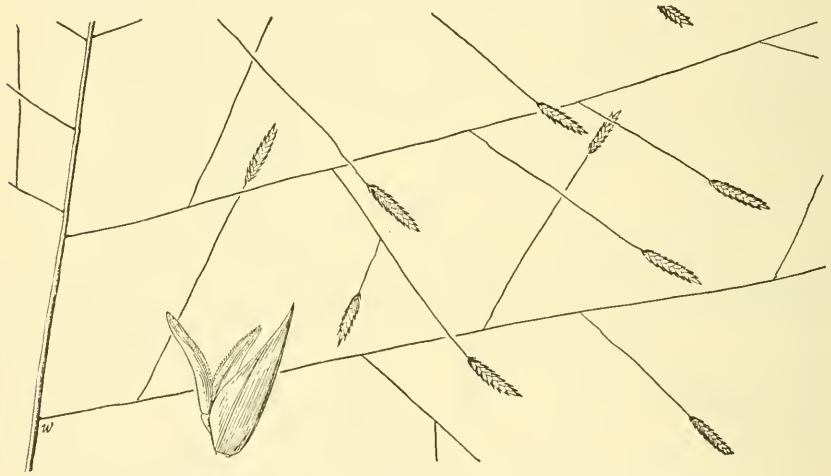

FIGURE 333.—*Eragrostis elliottii.* Panicle, × 1; floret, × 10. (Tracy 7384, Fla.)

lemmas 1.5 to 2 mm long, imbricate; palea persistent only a short time after the fall of the lemma, the naked rachilla persisting. 2↓ —Sandy roadsides, Florida (St. Petersburg); introduced from southeastern Asia.

FIGURE 334.—Distribution of *Eragrostis elliottii.*

46. Eragrostis bahiénsis Schrad. (Fig. 338, *A.*) Resembling *E. chariis*; panicle often more or less condensed; spikelets as much as 30-flowered; lemmas about 2 mm long; palea persistent. 2↓ —Introduced, Florida (Milton, Pensacola), Alabama (Mobile), and Louisiana (Avery Island); Brazil.

Eragrostis stenophýlla Hochst. Erect smooth annual, 30 to 40 cm tall, with loosely involute blades and rather loose panicle with ascending branches, the linear spikelets several-flowered, the lemmas 1.3

FIGURE 335.—*Eragrostis acuta*. Panicle, × 1; floret, × 10. (Type.)

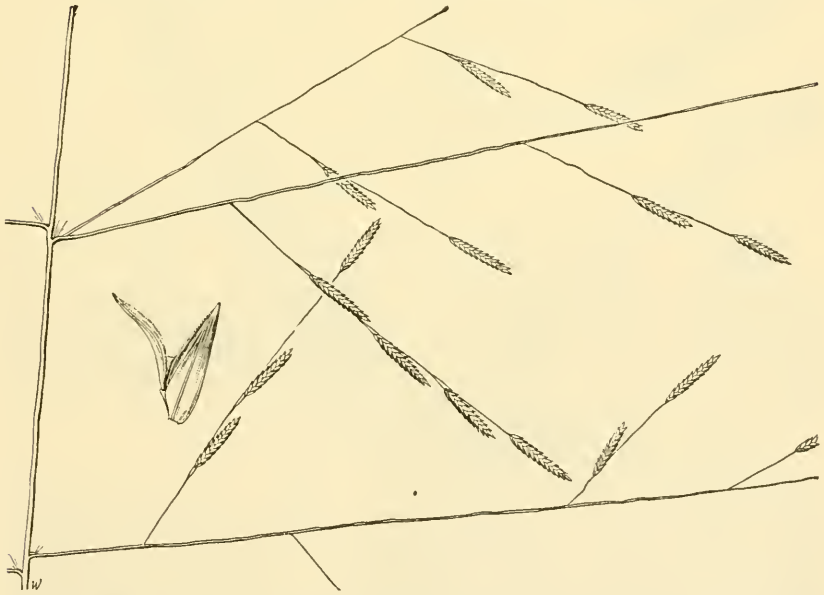

FIGURE 336.—*Eragrostis refracta*. Panicle, × 1; floret, × 10. (Kearney 1922, N. C.)

mm long. ⊙ —Mississippi (Biloxi), probably escaped from grass garden. India.

Eragrostis cyperoídes (Thunb.) Beauv. Stiff stout stoloniferous perennial with sharp-pointed blades and narrow elongate interrupted panicles, the distant branches with naked thorn like tips; spikelets coriaceous, crowded. 2l —Oregon (Linnton), on ballast. South Africa.

FIGURE 337.—Distribution of *Eragrostis refracta.*

ERAGROSTIS ABYSSÍNICA (Jacq.) Link. TEFF. Annual; culms branching and spreading, 30 to 100 cm tall; panicle large and open; spikelets 5- to 9-flowered, 6 to 8 mm long. ⊙ —Occasionally cultivated for ornament. Africa, where the seed is used for food.

ERAGROSTIS TENÉLLA (L.) Beauv. Tall branching annual; blades long, lax; panicles numerous, pale, 20 to 50 cm long, narrow but loose; spikelets minute. ⊙ (*E. japonica* Trin.)—Occasionally cultivated for ornament. Asia.

ERAGROSTIS OBTÚSA Munro. Low branching perennial; panicles open, 5 to 10 cm long; spikelets gray-olivaceous, broadly ovate, the lemmas almost horizontally spreading. 2l —Occasionally cultivated for ornament. South Africa.

ERAGROSTIS CHLOROMÉLAS Steud. Branching perennial, 40 to 65 cm tall with

FIGURE 338.—*A, Eragrostis bahiensis.* Panicle, × 1; floret, × 10. (Hitchcock 19862, La.) *B, E. chariis,* × 10. (Weatherwax 822, Fla.)

hard tufted base; blades involute; panicle loose, 8 to 12 cm long; spikelets dark olivaceous. 2l —Occasionally cultivated for ornament. South Africa.

ERAGROSTIS CÚRVULA (Schrad.) Nees. Tufted perennial, 60 to 120 cm tall; blades elongate, subinvolute with long flexuous setaceous tips; panicle 20 to 30 cm long, loose; spikelets dark olivaceous. 2l —Occasionally cultivated for ornament. South Africa.

13. CATABRÓSA Beauv.

Spikelets mostly 2-flowered, the florets rather distant, the rachilla disarticulating above the glumes and between the florets; glumes unequal, shorter than the lower floret, flat, nerveless, irregularly toothed at the broad truncate apex; lemmas broad, prominently 3-nerved, the nerves parallel, the broad apex scarious; palea about as long as the lemma, broad, scarious at the apex. Aquatic perennials,

with creeping bases, flat soft blades, and open panicles. Type species, *Catabrosa aquatica*. Name from Greek *katabrosis*, an eating up or devouring, referring to the toothed or eroded glumes.

1. Catabrosa aquática (L.) Beauv. BROOKGRASS. (Fig. 339.) Glabrous throughout; culms 10 to 40 cm long; blades mostly less than 10 cm long, 2 to 8 mm wide; panicle erect, 10 to 20 cm long, oblong or pyramidal, yellow to brown, the branches spreading in somewhat distant whorls; spikelets short-pediceled, about 3 mm long; glumes about 1.5 and 2 mm long; lemmas 2.5 to 3 mm long. 2l —Mountain meadows, around springs and along streams, Newfoundland and Labrador to Alberta, south through North Dakota and eastern Oregon to northern Arizona (fig. 340); Eurasia.

Cutándia memphítica (Spreng.) Richt. Low annual; blades flat; panicle few-

FIGURE 339.—*Catabrosa aquatica*. Plant, × ½; spikelet and floret, × 5. (Williams and Fernald, Que.)

flowered; spikelets on short pedicels, finally divergent on the zigzag branches. ⊙ —San Bernardino Mountains, Calif.; introduced from the Mediterranean region.

FIGURE 340.—Distribution of *Catabrosa aquatica*.

FIGURE 341.—*Molinia caerulea*. Plant, × ½; spikelet and floret, × 5. (Kirk 157, Vt.)

14. MOLÍNIA Schrank

Spikelets 2- to 4-flowered, the florets distant, the rachilla disarticulating above the glumes, slender, prolonged beyond the upper floret and bearing a rudimentary floret; glumes somewhat unequal, acute, shorter than the first lemma, 1-nerved; lemmas membranaceous, narrowed to an obtuse point, 3-nerved; palea bowed out below, equaling or slightly exceeding the lemma. Slender tufted perennials, with flat blades and narrow, rather open panicles. Type species, *Molinia caerulea*. Named for J. I. Molina.

1. Molinia caerúlea (L.) Moench. (Fig. 341.) Culms erect, 50 to 100 cm tall; blades 2 to 7 mm wide, erect, tapering to a fine point; panicle 10 to 20 cm long, purplish, the branches ascending, rather densely flowered, mostly floriferous to the base; spikelets short-pediceled, 4 to 7 mm long; lemmas about 3 mm long. 2l —Meadows and fields, introduced in a few localities, Maine to Pennsylvania (fig. 342); Eurasia.

FIGURE 342.—Distribution of *Molinia caerulea*

15. DIARRHÉNA Beauv.

(*Diarina* Raf.)

Spikelets few-flowered, the rachilla disarticulating above the glumes and between the florets; glumes unequal, acute, shorter than the lemmas, the first 1-nerved, the second 3- to 5-nerved; lemmas chartaceous, pointed, 3-nerved, the nerves converging in the point, the upper floret reduced; palea chartaceous, obtuse, at maturity the lemma and palea widely spread by the large turgid beaked caryopsis with hard shining pericarp; stamens 2 or 3. Perennials, with slender rhizomes, broadly linear, flat blades, long-tapering below, and narrow, few-flowered panicles. Type species, *Diarrhena americana*. Name from Greek *dis*, twice, and *arren*, male, alluding to the two stamens.

1. Diarrhena americána Beauv. (Fig. 343.) Culms slender, about 1 m tall; leaves approximate below the middle of the culm; sheaths pubescent toward the summit; blades elongate, 1 to 2 cm wide, scabrous to pubescent beneath; panicle long-exserted, drooping, 10 to 30 cm long, the branches few, appressed, the lower distant; spikelets 10 to 18 mm long, at first narrow, the florets expanded at maturity; lemmas 6 to 10 mm long. 2l (*Diarina festucoides* Raf.)—Rich or moist woods, West Virginia to Michigan and South Dakota, south to Tennessee, Arkansas, Oklahoma, and eastern Texas (fig. 344).

FIGURE 344.—Distribution of *Diarrhena americana*.

FIGURE 343.—*Diarrhena americana*. Plant, × ½; spikelet and floret, × 5. (Wilcox 66, Ill.)

16. DISSANTHÉLIUM Trin.

Spikelets mostly 2-flowered, the rachilla slender, disarticulating above the glumes and between the florets; glumes firm, nearly equal, acuminate, much longer than the lower floret, mostly exceeding all the florets, the first 1-nerved, the second 3-nerved; lemmas strongly compressed, oval or elliptic, acute, 3-nerved, the lateral nerves near the margin; palea somewhat shorter than the lemma. Annuals or perennials with narrow panicles. Type species, *Dissanthelium supinum* Trin. Name from Greek, *dissos*, double, and *anthelion*, a small flower, alluding to the two small florets.

1. Dissanthelium californicum (Nutt.) Benth. (Fig. 345.) Annual, lax; culms more or less decumbent or spreading, about 30 cm tall; blades flat, 10 to 15 cm long, 2 to 4 mm wide; panicle 10 to 15 cm long, narrow but rather loose, the branches in fascicles, ascending, slender, flexuous, some of them floriferous to base; glumes narrow, acute, nearly equal, about 3 mm long; lemmas pubescent, nearly 2 mm long. ⊙ —Open ground, islands off the southern coast of California and of Baja California.

FIGURE 345.—*Dissanthelium californicum*. Plant, × ½; spikelet and floret, × 10. (Trask 324, Calif.)

17. REDFIÉLDIA Vasey

Spikelets compressed, mostly 3- or 4-flowered, the rachilla disarticulating above the glumes and between the florets; glumes somewhat unequal, 1-nerved, acuminate; lemmas chartaceous, 3-nerved, the nerves parallel, densely villous at base; palea as long as the lemma; grain free. A rather tall perennial, with extensive rhizomes, and a large panicle with diffuse capillary branches. Type species, *Redfieldia flexuosa*. Named for J. H. Redfield.

1. Redfieldia flexuósa (Thurb.) Vasey. BLOWOUT GRASS. (Fig. 346.) Culms tough, 60 to 100 cm tall, the rhizomes long, slender; blades glabrous, involute, elongate, flexuous, tapering to a fine point; panicle oblong, one-third to half the entire length of the culm; spikelets 5 to 7 mm long, broadly V-shaped, the glumes acuminate, about half as long as the spikelet; lemmas acute, sometimes mucronate, 4 to 5 mm long. ♃ —Sand hills, South Dakota to Oklahoma, west to Colorado (Fort Garland) and Arizona (Moki Reservation) (fig. 347). A sand-binding grass.

FIGURE 346.—*Redfieldia flexuosa*. Plant, × ½; spikelet and floret, × 5. (Over 2429, S.Dak.)

18. MONANTHOCHLOE Engelm.

Plants dioecious; spikelets 3- to 5-flowered, the uppermost florets rudimentary, the rachilla disarticulating tardily in pistillate spikelets; glumes wanting; lemmas rounded on the back, convolute, narrowed above, several-nerved, those of the pistillate spikelets like the blades in texture; palea narrow, 2-nerved, in the pistillate spikelets convolute around the pistil, the rudimentary uppermost floret enclosed between the keels of the floret next below. A creeping wiry perennial, with clustered short subulate blades, the spikelets inconspicuous at the ends of the short branches, only a little exceeding the leaves. Type species, *Monanthochloë littoralis*. Name from Greek *monos*, single, *anthos*, flower, and *chloe*, grass, alluding to the unisexual flowers.

FIGURE 347.—Distribution of *Redfieldia flexuosa*.

1. Monanthochloë littorális Engelm. (Fig. 348.) Culms tufted, extensively creeping, the short branches erect; blades falcate, mostly less than 1 cm long, conspicuously distichous in distant to approximate clusters; spikelets 1 to few, nearly concealed in the leaves. 2↓—Muddy seashores and tidal flats, southern Florida, especially on the keys; Texas (Galveston and southward); southern California (Santa Barbara and southward); Mexico, Cuba.

19. DISTÍCHLIS Raf. SALTGRASS

Plants dioecious; spikelets several to many-flowered, the rachilla of the pistillate spikelets disarticulating above the glumes and between the florets; glumes unequal, broad, acute, keeled, 3- to 7-nerved, the lateral nerves sometimes faint; lemmas closely imbricate, firm, the pistillate coriaceous, acute or subacute, with 9 to 11 mostly faint nerves; palea as long as the lemma or shorter, the margins bowed out near the base, the pistillate coriaceous, enclosing the grain. Low perennials, with extensively creeping scaly rhizomes, erect, rather rigid culms, and dense, rather few-flowered panicles. Type species, *Distichlis spicata*. Name from Greek *distichos*, 2-ranked, alluding to the distichous leaves.

The species of *Distichlis* in general have little value for forage but in the interior basins, such as the vicinity of Salt Lake, *D. stricta* is grazed when better grasses are not available.

Plants mostly more than 30 cm tall; blades not conspicuously distichous, mostly 20 to 40 cm long; panicle more than 10 cm long; stolons present, long and stout ..... 4. D. TEXANA.

Plants mostly less than 30 cm tall; blades conspicuously distichous, mostly less than 10 cm long; panicle rarely more than 5 cm long; stolons wanting.

Palea as long as the lemma, firm, broad below, the broad wings of the keels finely dentate ..... 3. D. DENTATA.

Palea shorter than the lemma, rather soft, not much broader below, the narrow wings of the keels entire.

Panicles condensed, the spikelets imbricate, mostly 5- to 9-flowered. 1. D. SPICATA.

Panicles looser, the spikelets less imbricate, the individual spikelets plainly visible, mostly 9- to 15-flowered ..... 2. D. STRICTA.

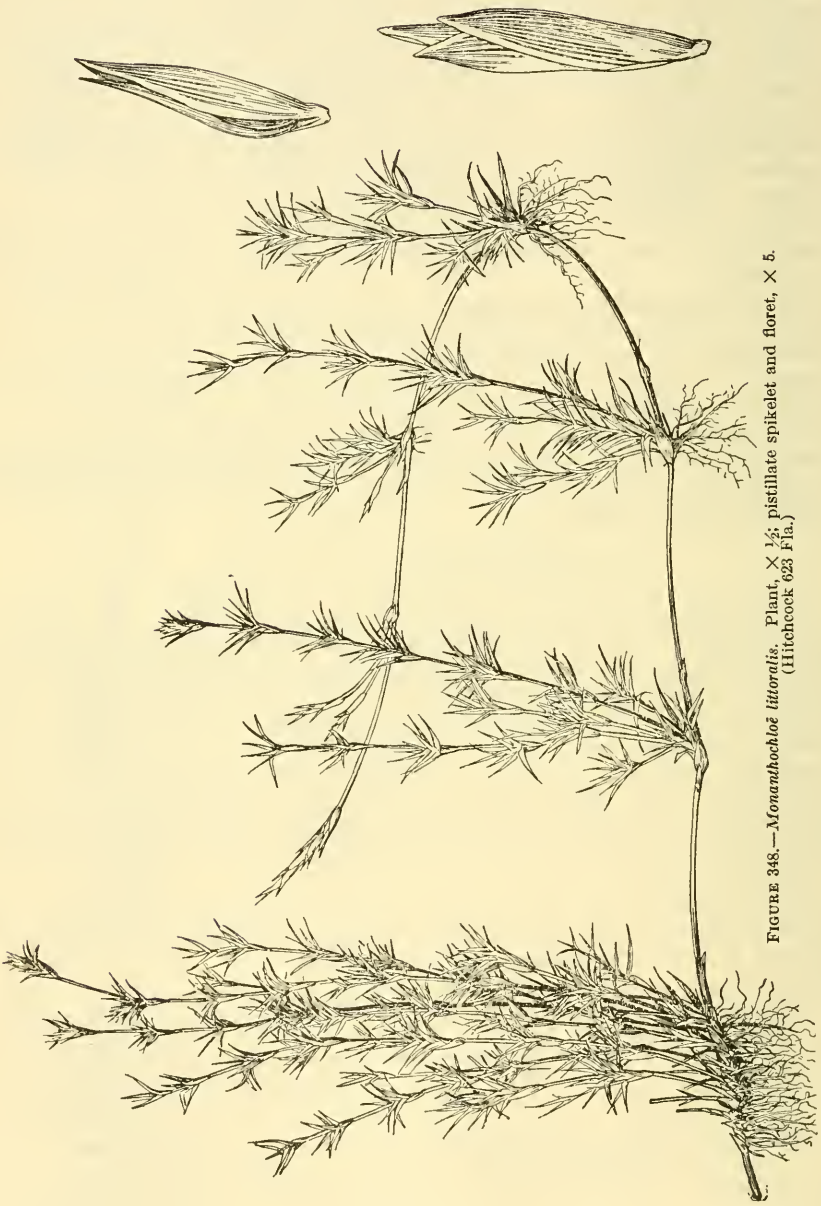

FIGURE 348.—*Monanthochloë littoralis*. Plant, × ½; pistillate spikelet and floret, × 5. (Hitchcock 623 Fla.)

1. Distichlis spicáta (L.) Greene. SEASHORE SALTGRASS. (Fig. 349.) Culms 10 to 40 cm tall, sometimes taller; leaves numerous, the sheaths closely overlapping, the spreading blades conspicuously distichous, flat to involute, sharp-pointed, mostly less than 10 cm long; panicle usually pale or greenish, 1 to 6 cm long, rarely longer; spikelets mostly 5- to 9-flowered, mostly 6 to 10 mm long, compressed; lemmas 3 to 6 mm long, the pistillate more coriaceous and more closely imbricate than the staminate; palea rather soft, narrow, the keels narrowly winged, entire; anthers about 2 mm long. ♃ —Seashores, forming dense colonies, Nova Scotia to Florida and Texas; British Columbia to California, Mexico and Cuba; Pacific slope of South America (fig. 350).

FIGURE 349.—*Distichlis spicata.* Plant, × 1; floret, × 5. (Hitchcock 2826, Oreg.)

2. Distichlis stricta (Torr.) Rydb. DESERT SALTGRASS. (Fig. 351.) Resembling *D. spicata;* panicles less congested, the individual spikelets easily distinguished; spikelets, especially the staminate, with more florets. ♃ —Alkaline soil of the interior, Saskatchewan to eastern Washington, south to Texas and California; Mexico (fig. 352). Staminate spikelets usually stramineous.

3. Distichlis dentáta Rydb. (Fig. 353.) Culms usually low, 10 to 20 cm, much-branched, rather stout; blades on the average wider than in *D. spicata;* panicles usually overtopped by the leaves; spikelets usually many-flowered, the florets firm, closely imbricate; palea about as long as the lemma, firm, much broader below, the keels with wide finely dentate wings. ♃ —Alkaline soil in the interior, western Colorado (Delta) to Washington, northern Arizona, and California (fig. 354). This and the two preceding species appear to be distinct for the most part but some specimens are intermediate.

FIGURE 350.—Distribution of *Distichlis spicata.*

4. Distichlis texána (Vasey) Scribn. (Fig. 355.) Culms erect from a decumbent base, 30 to 60 cm tall, producing extensively creeping rhizomes and long stout stolons; blades flat, firm, glabrous beneath, scabrous on the upper surface, mostly 20 to 40 cm long, 2 to

FIGURE 351.—*Distichlis stricta*. Staminate plant and pistillate panicle, × ½; pistillate spikelet and floret, × 5. (Mearns 3132, Calif.)

6 mm wide; panicle narrow, pale, 10 to 25 cm long, somewhat interrupted, the branches appressed; spikelets somewhat compressed, 4- to 8-flowered, 1 to 1.5 cm long; glumes 5 and 7 mm long, acute; lemmas of pistillate spikelets closely imbricate and appressed, about 8 mm long with 3 strong nerves, the intermediate nerves obscure, acute, the margins broad, hyaline; palea of pistillate spikelets shorter than the lemma, strongly bowed out below, closely convolute around the pistil, the keels with narrow erose or toothed wings; lemmas of staminate spikelets more spreading, about 6 mm long; palea about as long as the lemma, not bowed out, not convolute, the keels minutely scabrous, not winged; anthers 3 mm long. 2↓ —Sand flats, Presidio, Tex., and northern Mexico.

FIGURE 352.—Distribution of *Distichlis stricta.*

FIGURE 354.—Distribution of *Distichlis dentata.*

FIGURE 353.—*Distichlis dentata.* Panicle, × 1; floret, × 5. (Dupl. type.)

20. UNÍOLA L.

Spikelets 3- to many-flowered, the lower 1 to 4 lemmas empty, the rachilla disarticulating above the glumes and between the florets; glumes compressed-keeled, rigid, usually narrow, 3- to 7-nerved, acute or acuminate, rarely mucronate; lemmas compressed, sometimes conspicuously flattened, chartaceous, many-nerved, the nerves sometimes obscure, acute or acuminate, the empty ones at the base and the uppermost usually reduced; palea rigid, strongly keeled, bowed out at base, weakly so in *Uniola paniculata.* Rather tall, erect perennials, with flat or sometimes convolute blades and narrow or open panicles of compressed, sometimes very broad and flat spikelets. Type species, *Uniola paniculata.* Ancient Latin name of a plant.

The inland species are not abundant enough to be of value for forage. *Uniola latifolia* is worthy of cultivation as an ornamental; *U. paniculata* is a sand binder along the southern seacoast; the seeds of *U. palmeri* Vasey of Mexico are used for food by the Cocopa Indians.

FIGURE 355.—*Distichlis texana.* Panicle, × 1; lemma and palea, × 5. (Nealley, Tex.)

Rhizomes extensively creeping; blades firm, flat at base, tapering into a long flexuous involute point; empty lemmas about 4; coastal dunes.

1. U. PANICULATA.

Rhizomes wanting or short and knotty; blades thin, flat; empty lemma 1 (2 or 3 in *U. ornithorhyncha*); rich or moist woods.
Spikelets 8- to 12-flowered on slender pedicels; panicle nodding or drooping. 2. U. LATIFOLIA.
Spikelets 3- to 7-flowered, nearly sessile; panicle erect, nearly simple, the branches stiff.
Spikelets more than 10 mm (usually more than 12 mm) wide, with 5 to 7 fertile florets.
Sterile lemma 1; panicle 10 to 15 cm long, the lower branches with 2 to 5 rather distant spikelets---------- 3. U. NITIDA.
Sterile lemmas 2 or 3; panicle 3 to 8 cm long, the branches very short with approximate spikelets---------- 4. U. ORNITHORHYNCHA.
Spikelets rarely as much as 8 mm wide at maturity, V-shaped, with 1 to 4 fertile florets (rarely more), and 1 sterile lemma.
Collar of sheath pubescent, the sheaths commonly loosely long-pubescent, rarely glabrous---------- 5. U. SESSILIFLORA.
Collar and sheaths glabrous or nearly so. ----------6. U. LAXA.

1. Uniola paniculáta L. SEA OATS. (Fig. 356.) Culms stout, about 1 m tall, from extensively creeping rhizomes; blades flat, firm, elongate, becoming involute toward the long, fine flexuous point; panicle pale, narrow, condensed, heavy and nodding, 20 to 40 cm long, the branches arching and drooping, as much as 12 cm long; spikelets very flat, 10- to 20-flowered, mostly 2 to 2.5 cm long, 1 cm wide, the first 4 or 5 lemmas empty, the slender pedicels shorter than the spikelets; lemmas about 9-nerved, strongly compressed-keeled, about 1 cm long, acute; palea acute, as long as the lemma, the strong wings of the keels ciliate. 2n —Sand dunes of the seacoast, Cape Henry to Florida and Texas; northern West Indies; eastern Mexico (fig. 357).

FIGURE 356.—*Uniola paniculata.* Plant, × 1/10; spikelets, × 1. (Kearney 2134, Va.)

FIGURE 357.—Distribution of *Uniola paniculata.*

2. Uniola latifólia Michx. BROADLEAF UNIOLA. (Fig. 358.) Culms 1 to 1.4 m tall, with short strong rhizomes, forming colonies; blades flat, narrowly lanceolate, 10 to 20 cm long, mostly 1 to 2 cm wide; panicle open, drooping, 10 to 20 cm long, the branches bearing a few large, very flat spikelets, the pedicels capillary; spikelets 8- to 12-flowered, 2 to 3.5 cm long, 1 to 1.5 cm wide, green or finally tawny, the first lemma empty; lemmas lanceolate, strongly compressed-keeled, acute, about 1 cm long, striate-nerved, the keel

FIGURE 358.—*Uniola latifolia.* Plant, × ½; spikelet and floret, × 3. (Chase 5874, Md.)

ciliate with soft ascending hairs, the callus pilose; palea shorter than the lemma, wing-keeled; caryopsis flat, oval, black, 5 mm long. 2l —Rich woods, Pennsylvania and New Jersey to Illinois and Kansas, south to Florida and Texas (fig. 359).

3. Uniola nítida Baldw. (Fig. 360.) Culms slender, 50 to 75 cm tall, erect, loosely tufted, with short rhizomes; blades flat, spreading, mostly less than 15 cm long, 4 to 8 mm wide; panicle open, few-flowered, 10 to 15 cm long, with a few spreading branches 3 to 8 cm long, bearing 2 to 5 nearly sessile spikelets; spikelets 4- to 7-flowered, 1 to 1.5 cm long, about 1 cm wide, the first lemma empty; lemmas spreading, 7 to 10 mm long, compressed-keeled, gradually acuminate, striate-nerved; palea equaling the lemma, acuminate, 2-toothed, the keels prominently winged. 2l —Moist woods, South Carolina to Florida.

FIGURE 359.—Distribution of *Uniola latifolia.*

4. Uniola ornithorhýncha Steud. (Fig. 361.) Culms slender, 30 to 50 cm tall, loosely tufted with short rhizomes; sheaths pubescent on the collar; blades flat, thin, mostly less than 15 cm long, 3 to 6 mm wide; panicle narrow, 3 to 9 cm long, the short approximate branches with 1 to 3 nearly sessile spikelets or the lower somewhat

FIGURE 360.—*Uniola nitida.* Plant, × 1; floret, × 5. (Curtiss 3521, Fla.)

distant with 4 to 6 spikelets, pubescent in the axils; spikelets very flat, with 3 or 4 widely spreading fertile florets, the 2 or 3 lower lemmas empty, appressed; fertile lemmas about 8 mm long, narrow, gradually acuminate, striate-nerved; palea as long as or longer than the lemma, acuminate, 2-toothed, strongly bowed out below, the keels rather narrowly winged. 2l —Low woods or hummocks in swamps, Alabama to Louisiana.

5. Uniola sessiliflóra Poir. (Fig. 362.) Culms erect, 0.5 to 1.5 m tall, in loose tufts with short rhizomes; sheaths pilose, at least toward the summit; blades elongate, firm, mostly sparsely pilose on the upper surface toward the base, 5 to 10 mm wide, tapering to base; panicle long-exserted, 20 to 50 cm long, narrow, the branches distant, stiffly ascending or appressed, the lower as much as 7 cm long, the upper short, somewhat capitate; spikelets nearly sessile, aggregate in clusters, flat, usually 3- to 5-flowered, broadly V-shaped at maturity, the first

FIGURE 361.—*Uniola ornithorhyncha*. Plant, × 1; floret, × 5. (Tracy and Lloyd 448, Miss.)

FIGURE 362.—*Uniola sessiliflora*. Plant, × 1; floret, × 5. (Tracy, Miss.)

lemma empty; glumes about 2 mm long; lemmas spreading, about 5 mm long, acuminate, beaked, especially before maturity, striate nerved; palea shorter than the lemma, acute, broad, the keels narrowly winged; grain black, 3 mm long, at maturity spreading the lemma and palea. 2l (*U. longifolia* Scribn.)—Rich woods, southeastern Virginia to Tennessee and Oklahoma, south to Florida and eastern Texas (fig. 363).

6. Uniola láxa (L.) B.S.P. (Fig. 364.) Culms slender, 60 to 100 cm tall, erect to nodding from a loosely tufted sometimes knotty base; blades elongate, flat to sometimes loosely involute, 3 to 6 mm wide; panicle narrow, slender, 15 to 30 cm long, the branches short, appressed, approximate, the lower sometimes 3 cm long and distant; spikelets nearly sessile, approximate, flat, usually 3- to 4-flowered, the first lemma empty; lemmas spreading, 4 to 5 mm long, gradually acuminate, striate-nerved; palea broad, the keels narrowly winged; grain black, 2.5 mm long, at maturity spreading the lemma and palea. 2l —Moist woods, Coastal Plain, Long Island to Florida and Texas, extending to western North Carolina, Kentucky, and Arkansas (fig. 365).

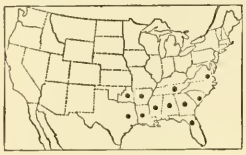

FIGURE 363.—Distribution of *Uniola sessiliflora.*

21. DÁCTYLIS L. Orchard grass

Spikelets few-flowered, compressed, finally disarticulating between the florets, nearly sessile in dense 1-sided fascicles, these borne at the ends of the few branches of a panicle; glumes unequal, carinate, acute, hispid-ciliate on the keel; lemmas compressed-keeled, mucronate, 5-nerved, ciliate on the keel. Perennials, with flat blades and fascicled spikelets. Type species, *Dactylis glomerata.* Name from Greek *dactulos*, a finger, alluding to the stiff branches of the panicle.

FIGURE 364.—*Uniola laxa.* Plant, × 1; floret, × 5. (Van Eseltine and Moseley 178, D.C.)

1. Dactylis glomeráta L. Orchard grass. (Fig. 366.) Culms in large tussocks, 60 to 120 cm tall; blades elongate, 2 to 8 mm wide; panicles 5 to 20 cm long, the few distant stiff solitary branches ascending, or spreading at anthesis, appressed at maturity, the lowermost sometimes as much as 10 cm long; lemmas about 8 mm long, mucronate or short-awned. 2l —Fields, meadows, and waste places, Newfoundland to southeastern Alaska, south to Florida and central California; Eurasia. Commonly cultivated as a meadow and pasture grass. In England called cocksfoot. A variegated form (called by gardeners var. *variegata*) is occasionally cultivated for borders.

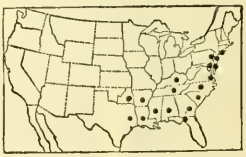

FIGURE 365.—Distribution of *Uniola laxa.*

22. CYNOSÚRUS L. Dogtail

Spikelets of two kinds, sterile and fertile together, the fertile sessile, nearly covered by the short-pediceled sterile one, these pairs imbricate in a dense 1-sided spikelike panicle; sterile spikelets consisting of 2 glumes and several narrow, acuminate, 1-nerved lemmas on a continuous rachilla; fertile spikelets 2- or 3-flowered, the glumes narrow, the lemmas broader, rounded on the back, awn-tipped, the rachilla disarticulating above

FIGURE 366.—*Dactylis glomerata*. Plant, × ½; spikelet and floret, × 5. (Wilson 1334, Conn.)

the glumes. Annuals or perennials with narrow flat blades and dense spikelike or subcapitate panicles. Type species, *Cynosurus*

FIGURE 367.—*A. Cynosurus cristatus.* Plant, × ½; fertile spikelet and floret, × 5. (Waghorne 23, Newf.) *B. C. echinatus.* Panicle × 1; fertile floret, × 5. (Macoun 80976, Vancouver Isl.)

cristatus. Name from Greek *kuon (kun-)* dog, and *oura*, tail.

Plants perennial; panicles narrow, spikelike; awns inconspicuous ..... 1. C. CRISTATUS.
Plants annual; panicles subcapitate; awns conspicuous ..... 2. C. ECHINATUS.

1. Cynosurus cristátus L. CRESTED DOGTAIL. (Fig. 367, *A*.) Perennial; culms tufted or geniculate at base, erect, 30 to 60 cm tall; panicle spikelike, linear, more or less curved, 3 to 8 cm long; pairs of spikelets about 5 mm long; lemmas with awns mostly not more than 1 mm long. 2n —Fields and waste places, Newfoundland to Michigan and Virginia; Washington and Oregon (fig. 368); introduced from Europe. Occasionally cultivated in mixtures for meadows but of little value.

2. Cynosurus echinátus L. (Fig. 367, *B.*) Annual; culms 20 to 40 cm tall; blades short; panicle subcapitate, 1 to 4 cm long, bristly; pairs of spikelets 7 to 10 mm long; lemmas with awns 5 to 10 mm long. ⊙ —Open ground, British Columbia; Oregon to central California; introduced from Europe.

23. LAMÁRCKIA Moench

(*Achyrodes* Boehmer)

Spikelets of two kinds, in fascicles, the terminal one of each fascicle fertile, the others sterile; fertile spikelet with 1 perfect floret on a slender stipe and a rudimentary floret on a long rachilla-joint, both awned, the glumes narrow, acuminate or short-awned, 1-nerved; lemma broader, scarcely nerved, bearing just below the apex a delicate awn; sterile spikelets linear, 1 to 3 in each fascicle, consisting of 2 glumes similar to those of the fertile spikelet, and numerous imbricate, obtuse, awnless, empty lemmas, a reduced spikelet similar to the fertile one borne on the pedicel with one of the sterile ones.—Low annual with flat blades and oblong, 1-sided, dense panicles, the crowded fascicles drooping, the fertile being hidden, except the awns, by the numerous sterile ones; fascicles falling entire. Type species, *Lamarckia aurea.* Named for J. B. Lamarck.

FIGURE 368.—Distribution of *Cynosurus cristatus.*

1. Lamarckia aúrea (L.) Moench. GOLDEN-TOP. (Fig. 369.) Culms erect or decumbent at base, 10 to 40 cm tall; blades soft, 3 to 7 mm wide; panicle dense, 2 to 7 cm long, 1 to 2 cm wide, shining, golden-yellow to purplish, the branches short, erect, the branchlets capillary, flexuous; pedicels fascicled, pubescent, with a tuft of long whitish hairs at the base; fertile spikelet about 2 mm long, the awn of lemma about twice as long as the spikelet; sterile spikelet 6 to 8 mm long. ⊙ —Open ground and waste places, Texas, Arizona, southern California, and northern Mexico; introduced from the Mediterranean region. Sometimes cultivated for ornament.

24. ARÚNDO L.

Spikelets several-flowered, the florets successively smaller, the summits of all about equal, the rachilla glabrous, disarticulating above the glumes and between the florets; glumes somewhat unequal, membranaceous, 3-nerved, narrow, tapering into a slender point, about as long as the spikelet; lemmas thin, 3-nerved, densely and softly long-pilose, gradually narrowed at the summit, the nerves ending in slender teeth, the middle one extending into a straight awn. Tall perennial reeds, with broad linear blades and large plumelike terminal panicles. Type species, *Arundo donax. Arundo*, the ancient Latin name.

1. Arundo dónax L. GIANT REED. (Fig. 370.) Culms stout, in large clumps, 2 to 6 m tall, sparingly branching, from thick knotty rhizomes; blades numerous, elongate, 5 to 7 cm wide on the main culm, conspicuously distichous, spaced rather evenly along the culm, the margin scabrous; panicle dense, erect, 30 to 60 cm long; spikelets 12 mm long. ♃ —Along irrigation ditches, Texas to southern

FIGURE 339.—*Lamarckia aurea*. Plant, × ½; fertile spikelet and floret, × 5. (Baker 5275, Calif.)

FIGURE 370.—*Arundo donax*. Plant, × ⅓; spikelet and floret, × 3. (Biltmore Herb. 7514, N.C.)

California, occasionally established eastward; tropical America; introduced from the warm regions of the Old World. Frequently cultivated for ornament, including var. VERSICOLOR (Miller) Stokes, with white-striped blades. In the Southwest the culms are used for lattices, mats, and screens, and in the construction of adobe huts. In Europe the culms are used for making the reeds of clarinets and organ pipes.

GYNÉRIUM Humb. and Bonpl.

Plants dioecious; spikelets several-flowered, the pistillate with long-attenuate glumes and smaller long-silky lemmas, the staminate with shorter glumes and glabrous lemmas. Tall perennial reeds with plumelike panicles. Type species, *Gynerium saccharoides* (*G. sagittatum*). Name from Greek *gune*, female, and *erion*, wool, referring to the woolly pistillate spikelets.

Gynerium sagittátum (Aubl.) Beauv. UVA GRASS. Culms as much as 10 or 12 m tall, clothed below with the overlapping old sheaths,

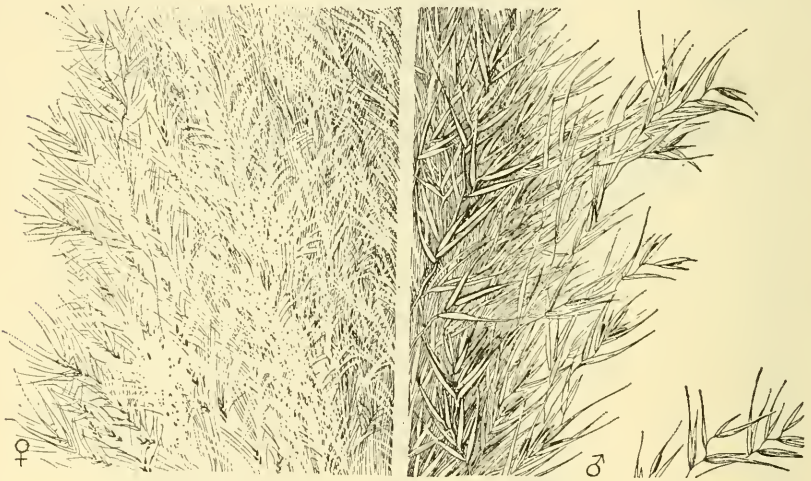

FIGURE 371.—*Cortaderia selloana*. Pistillate (♀) and staminate (♂) panicles, × 1. (Silveus 308, Tex.)

the blades having fallen; blades sharply serrulate, commonly 2 m long, 4 to 6 cm wide, forming a great fan-shaped summit to the sterile culms, panicle pale, plumelike, densely flowered, 1 m or more long, the main axis erect, the branches drooping. 2[4] —Occasionally cultivated for ornament in greenhouses. River banks and wet ground, tropical America.

25. CORTADÉRIA Stapf. PAMPASGRASS

Spikelets several-flowered; rachilla internodes jointed, the lower part glabrous, the upper bearded, forming a stipe to the floret; glumes longer than the lower florets; lemmas of pistillate spikelets clothed with long hairs. Large tussock grasses, with leaves crowded at the base, the blades elongate, narrow, attenuate, the margins usually serrulate; panicle large, plumelike. Type species, *Cortaderia*

argentea (*C. selloana*). Name from the Argentine native name *cortadera*, cutting, because of the cutting edges of the blades.

1. Cortaderia selloána (Schult.) Aschers. and Graebn. PAMPAS-GRASS. (Fig. 371.) Dioecious perennial reed, in large bunches; culms stout, erect, 2 to 3 or more m tall; panicle feathery, silvery white to pink, 30 to 100 cm long; spikelets 2- to 3-flowered, the pistillate silky with long hairs, the staminate naked; glumes white, papery, long, slender; lemmas bearing a long slender awn. 2l (*Gynerium argenteum* Nees.)—Plains and open slopes, Brazil to Argentina and Chile. Cultivated as a lawn ornamental in the warmer parts of the United States; in southern California grown commercially for the plumes which are used for decorative purposes, the culms here being sometimes as much as 7 m tall.

CORTADERIA RUDIÚSCULA Stapf. Differing from *C. selloana* in the looser yellowish or purplish panicle; spikelets somewhat smaller. 2l —Occasionally cultivated for ornament; Argentina. Has been called *C. quila* Stapf, but that name is ultimately based on *Arundo quila* Molino, which is a bamboo, *Chusquea quila* (Molino) Kunth.

AMPELODÉSMOS MAURITÁNICUS (Poir.) Dur. and Schinz. Tall slender reed; blades with a half twist at base, elongate, thick, narrow, ending in a long scabrous setaceous tip; panicle 30 to 50 cm long, the slender branches drooping, naked at base, with large crowded spikelets toward the ends. 2l —Grown for ornament in California. Mediterranean region. Generic name often incorrectly spelled *Ampelodesma*.

26. PHRAGMÍTES Trin.

Spikelets several-flowered, the rachilla clothed with long silky hairs, disarticulating above the glumes and at the base of each joint between the florets, the lowest floret staminate or neuter; glumes 3-nerved, or the upper 5-nerved, lanceolate, acute, unequal, the first about half as long as the upper, the second shorter than the florets; lemmas narrow, long-acuminate, glabrous, 3-nerved, the florets successively smaller, the summits of all about equal; palea much shorter than the lemma. Perennial reeds, with broad, flat, linear blades and large terminal panicles. Type species, *Arundo phragmites* L. (*Phragmites communis*). Name from Greek in reference to its growth like a fence (*phragma*) along streams.

1. Phragmites commúnis Trin. COMMON REED. (Fig. 372.) Culms erect, 2 to 4 m tall, with stout creeping rhizomes and often also with stolons; blades flat, 1 to 5 cm wide; panicle tawny, 15 to 40 cm long, the branches ascending, rather densely flowered; spikelets 12 to 15 mm long, the florets exceeded by the hairs of the rachilla. 2l (*P. phragmites* Karst.)—Marshes, banks of lakes and streams, and around springs, Nova Scotia to British Columbia, south to Delaware, Illinois, Louisiana, and California; Florida; Mexico and West Indies to Chile and Argentina (fig. 373); Eurasia, Africa, Australia.

In the Southwest this, in common with *Arundo donax*, is called by the Mexican name carrizo and is used for lattices in the construction of adobe huts. The stems were used by the Indians for shafts of arrows, and in Mexico and Arizona for mats and screens, for thatching, cordage, and carrying nets.

FIGURE 372.—*Phragmites communis.* Plant, × ⅓; spikelet and floret, × 3. (Hitchcock 5078, N.Dak.)

27. NEYRAÚDIA Hook. f.

Spikelets 4- to 8-flowered; rachilla jointed about half way between the florets, the part below the joint glabrous, the part above bearded, forming a stipe below the mature floret; glumes unequal, 1-nerved; lemmas narrow, 3-nerved, acuminate, conspicuously long-pilose on the margins, awned from between 2 fine teeth, the awn recurved. A tall perennial with large open many-flowered panicles. Type species, *Neyraudia madagascariensis* (Kunth) Hook. f. (*N. arundinacea* (L.) Henr.) Name an anagram of *Reynaudia*, a genus of Cuban grasses.

FIGURE 373.—Distribution of *Phragmites communis*.

1. Neyraudia reynaudiána (Kunth) Keng. (Fig. 374.) Reed-like perennial, 1 to 3 m tall, resembling *Phragmites communis;* sheaths woolly at the throat and on the collar; blades flat, 1 to 2 cm wide or sometimes narrow and subinvolute; panicle nodding, 30 to 60 cm long, rather densely flowered; spikelets 4- to 8-flowered, the lowest 1 or 2 lemmas empty, 6 to 8 mm long, rather short-pedicled along the numerous panicle branches; lemmas somewhat curved, slender, the awn flat, recurved. ♃ —Planted in testing garden at Coconut Grove, Fla., and occasionally escaped; native of southern Asia.

28. MÉLICA L. Melicgrass

Spikelets 2- to several-flowered, the rachilla disarticulating above the glumes and between the fertile florets (in some species spikelets falling entire), prolonged beyond the perfect florets and bearing 2

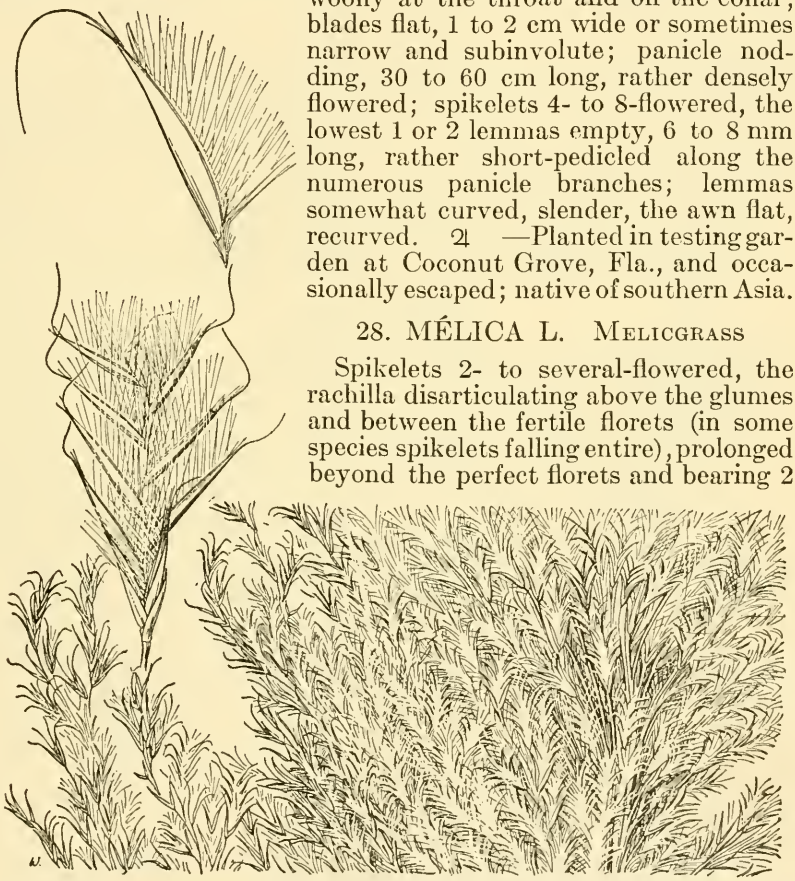

FIGURE 374.—*Neyraudia reynaudiana*. Panicle, × 1; spikelet, × 5; floret, × 10. (Moldenke 432, Fla.)

or 3 approximate gradually smaller empty lemmas, each enclosing the one above; glumes somewhat unequal, thin, often papery, scarious-margined, obtuse or acute, sometimes nearly as long as the

lower floret, 3- to 5-nerved, the nerves usually prominent; lemmas convex, several-nerved, membranaceous or rather firm, scarious-margined, sometimes conspicuously so, awnless or sometimes awned from between the teeth of the bifid apex, the callus not bearded. Rather tall perennials, the base of the culm often swollen into a corm, with closed sheaths, usually flat blades, narrow or sometimes open, usually simple panicles of relatively large spikelets. Type species, *Melica nutans* L. *Melica*, an Italian name for a kind of sorghum probably from the sweet juice (mel, honey).

The species are in general palatable grasses but, not being gregarious, do not furnish much forage. Important species are *M. porteri*, *M. imperfecta*, and *M. subulata*.

Spikelets narrow; lemmas acute (obtuse in *M. harfordii*) or awned. SECTION 1. BROMELICA.
Spikelets broad; lemmas obtuse, awnless SECTION 2. EUMELICA.

Section 1. Bromelica

Lemmas long-awned from a bifid apex.
  Branches of panicle few, distant, spreading, naked on the lower half. 1. M. SMITHII.
  Branches of panicle short, appressed, spikelet-bearing from near the base. 2. M. ARISTATA.
Lemmas awnless or minutely awned.
  Culms not bulbous at base; lemmas obtuse 3. M. HARFORDII.
  Culms bulbous at base; lemmas acute or acuminate.
    Lemmas acuminate, usually pilose; panicle narrow, the branches short, usually appressed 4. M. SUBULATA.
    Lemmas acute; panicle broad, the branches long and spreading. 5. M. GEYERI.

Section 2. Eumelica

1a. Culms bulbous at base (see also *M. californica*).
  Pedicels capillary, flexuous or recurved; panicle narrow 6. M. SPECTABILIS.
  Pedicels stouter, appressed.
    Rachilla soft, enlarged, wrinkled in drying, usually brownish 8. M. FUGAX.
    Rachilla firm, whitish, not wrinkled.
      Panicle rather dense, the branches short, appressed, usually imbricate; glumes thin, indistinctly nerved 7. M. BULBOSA.
      Panicle loosely flowered, the branches, or some of them, stiffly ascending-spreading in anthesis, usually somewhat distant, scarcely imbricate; glumes firm, distinctly nerved 9. M. INFLATA.
1b. Culms not distinctly bulbous at base (somewhat swollen in *M. californica*).
  2a. Spikelets falling entire, nodding to pendulous on capillary pedicels.
    Panicle narrow; spikelets 4- or 5-flowered.
      Spikelets reflexed; glumes 1 to 1.5 cm long 10. M. STRICTA.
      Spikelets not reflexed; glumes less than 1 cm long 11. M. PORTERI.
    Panicle open, the lower branches spreading; spikelets mostly 2- or 3-flowered.
      Glumes nearly as long as the usually 2-flowered spikelet; apexes of the 2 florets about the same height; panicle simple or nearly so. 12. M. MUTICA.
      Glumes shorter than the usually 3-flowered spikelet; apex of second floret a little higher than that of the first; panicle compound. 13. M. NITENS.
  2b. Spikelets not falling entire, not pendulous.
    Spikelets 4 to 6 mm long; fertile florets 1 or 2.
      Fertile lemmas pubescent; fertile florets often 2 14. M. TORREYANA.
      Fertile lemmas glabrous; fertile floret usually 1 15. M. IMPERFECTA.
    Spikelets 8 to 15 mm long; fertile florets 2 to several.
      Spikelets silvery white; glumes about as long as the spikelet; plant tall, somewhat woody 16. M. FRUTESCENS.
      Spikelets tawny to purplish; glumes shorter than the spikelet; plant lower, herbaceous 17. M. CALIFORNICA.

SECTION 1. BROMÉLICA Thurb.

Spikelets narrow; glumes usually narrow, scarious margined (papery in *M. geyeri*); sterile lemmas similar to the acute (obtuse in *M. harfordii*) or awned fertile lemmas.

1. Melica smíthii (Porter) Vasey. SMITH MELIC. (Fig. 375.) Culms slender, 60 to 120 cm tall; sheaths retrorsely scabrous; blades lax, scabrous, 10 to 20 cm long, 6 to 12 mm wide; panicle 12 to 25 cm long, the branches solitary, distant, spreading, naked below, sometimes reflexed, as much as 10 cm long; spikelets 3- to 6-flowered, 18 to 20 mm long, sometimes purplish; glumes acute; lemmas about 10 mm long, with an awn 3 to 5 mm long. 2↓ (*Avena smithii* Porter.)—Moist woodlands, western Ontario and northern Michigan to British Columbia, south to Wyoming (Teton Mountains) and Oregon (Wallowa Mountains) (fig. 376).

FIGURE 375.—*Melica smithii*. Panicle, × 1; floret, × 5. (Robbins, Mich.)

2. Melica aristáta Thurb. (Fig. 377.) Culms erect or decumbent below, 60 to 100 cm tall; sheaths scabrous to pubescent; blades 3 to 5 mm wide, more or less pubescent; panicle narrow, 10 to 15 cm long, the branches short, mostly appressed or ascending; spikelets, excluding awns, about 15 mm long; glumes 10 to 12 mm long; lemmas 7-nerved, scabrous, awned, the awn 6 to 10 mm long. 2↓ —Dry woods, meadows, and open slopes, Washington to the central Sierras of California.

3. Melica harfórdii Boland. HARFORD MELIC. (Fig. 378.) Culms tufted, 60 to 120 cm tall, often decumbent below; sheaths scabrous to villous; blades scabrous, firm, flat to subinvolute, 1 to 4 mm wide; panicle narrow, 10 to 15 cm long, the branches appressed; spikelets 1 to 1.5 cm long, short-pediceled; glumes 7 to 9 mm long, obtuse; lemmas rather faintly 7-nerved, hispidulous below, pilose on the lower part of the margin, the apex emarginate, mucronate, or with an awn less than 2 mm long. 2↓ —Open dry woods and slopes, British Columbia to the Cascade Mountains of Oregon, south to Monterey

FIGURE 376.—Distribution of *Melica smithii*.

FIGURE 377.—*Melica aristata*. Plant, × ½; spikelet and floret, × 5. (Cusick 2888, Oreg.)

County and the Yosemite National Park, Calif. A smaller form with narrow involute blades has been called *M. harfordii* var. *minor* Vasey.

4. Melica subuláta (Griseb.) Scribn. ALASKA ONIONGRASS. (Fig. 379.) Culms 60 to 125 cm tall, mostly bulbous at base; sheaths retrorsely scabrous, often pilose; blades thin, usually 2 to 5 mm wide, sometimes wider; panicle usually narrow, mostly 10 to 15 cm long, the branches appressed or sometimes spreading; spikelets narrow, 1.5 to 2 cm long, loosely flowered; glumes narrow, obscurely nerved, the second about 8 mm long; lemmas prominently 7-nerved, tapering to an acuminate point, awnless, the nerves more or less pilose-ciliate. 2l —Meadows, banks, and shady slopes, western Wyoming and Montana to Alaska, south in the mountains to Mount Tamalpais and Lake Tahoe, Calif. (fig. 380); Chile.

FIGURE 378.—*Melica harfordii*. Panicle, × 1; floret, × 5. (Yates 457, Calif.)

FIGURE 379.—*Melica subulata*. Panicle, × 1; floret, × 5. (Hitchcock 11631, Wash.)

5. Melica gêyeri Munro. GEYER ONIONGRASS. (Fig. 381.) Culms 1 to 1.5 m tall, bulbous at base; sheaths usually glabrous, sometimes slightly scabrous or pubescent; blades scabrous (rarely puberulent), mostly less than 5 mm wide; panicle 10 to 20 cm long, open, the branches slender, rather distant, spreading, bearing a few spikelets above the middle; spikelets 12 to 20 mm long; glumes broad, smooth, papery, the second about 6 mm long; lemmas 7-nerved, scaberulous or nearly glabrous, narrowed to an obtuse point, awnless. 2l —Open dry woods and rocky slopes, at medium altitudes, western Oregon to central California in the Coast Range; infrequent in the Sierras to Placer County; Yellowstone Park, Wyo.

FIGURE 380.—Distribution of *Melica subulata*.

SECTION 2. EUMÉLICA Aschers.

Spikelets broad; glumes broad; papery; lemmas awnless; sterile lemmas small, aggregate in a rudiment more or less hidden in the upper fertile lemmas.

6. Melica spectábilis Scribn. PURPLE ONIONGRASS. (Fig. 382.) Culms 30 to 100 cm tall, bulbous at base; sheaths pubescent; blades flat to subinvolute, 2 to 4 mm wide; panicle mostly 10 to 15 cm long,

narrow, the branches appressed; spikelets purple-tinged, rather turgid, 10 to 15 mm long, the pedicels capillary, flexuous; glumes broad, papery; lemmas strongly 7-nerved, obtuse, scarious-margined, imbricate. 2l —Rocky or open woods and thickets, Montana to

FIGURE 381.—*Melica geyeri.* Plant, × 1; floret, × 5. (Heller 11932, Calif.)

FIGURE 382.—*Melica spectabilis.* Plant, × 1; floret, × 5. (Tweedy 85, Wyo.)

British Columbia, south to Colorado and northern California (fig. 383).

7. Melica bulbósa Geyer. ONIONGRASS. (Fig. 384.) Culms 30 to 60 cm tall, bulbous at base, resembling *M. spectabilis;* sheaths and blades flat to involute, 2 to 4 mm wide, glabrous, scabrous, or pubescent; panicle narrow, rather densely flowered, the branches short, appressed, rather stiff, mostly imbricate; spikelets papery with age, mostly 7 to 15 mm long, the short pedicels stiff, erect; lemmas obscurely nerved,

obtuse or slightly emarginate. ♃ (*M. bella* Piper.)—Rocky woods and hills, Montana to British Columbia, south to Colorado and California; western Texas (Jeff Davis County) (fig. 385). Specimens with pubescent foliage have been differentiated as *M. bella intonsa* Piper.

FIGURE 383.—Distribution of *Melica spectabilis.*

FIGURE 384.—*Melica bulbosa.* Plant, × 1; floret, × 5. (Tidestrom 1252, Utah.)

8. Melica fúgax Boland. LITTLE ONIONGRASS. (Fig. 386.) Culms mostly 20 to 40 cm tall, in loose tufts, the bulbs prominent; sheaths retrorsely scabrous; blades 1.5 to 4 mm wide, scabrous, usually pubescent on the upper surface; panicle 8 to 15 cm long, the branches stiffly spreading or reflexed at anthesis, the lower 2 to 4 cm long; spikelets 8 to 14 mm long, the florets somewhat distant, usually purple-tinged, the rachilla soft, wrinkled in drying, often brownish; second glume nearly as long as the lower lemma; lemmas obscurely nerved, obtuse or emarginate. ♃ — Dry hills and open woods, Washington to Nevada and central California (fig. 387).

FIGURE 385.—Distribution of *Melica bulbosa.*

9. Melica inflàta (Boland.) Vasey. (Fig. 388.) Culms 60 to 100 cm tall, bulbous at base; sheaths glabrous or pubescent; blades flat, 2 to 4 mm wide; panicle 15 to 20 cm long, narrow, the rather distant branches, or some of them,

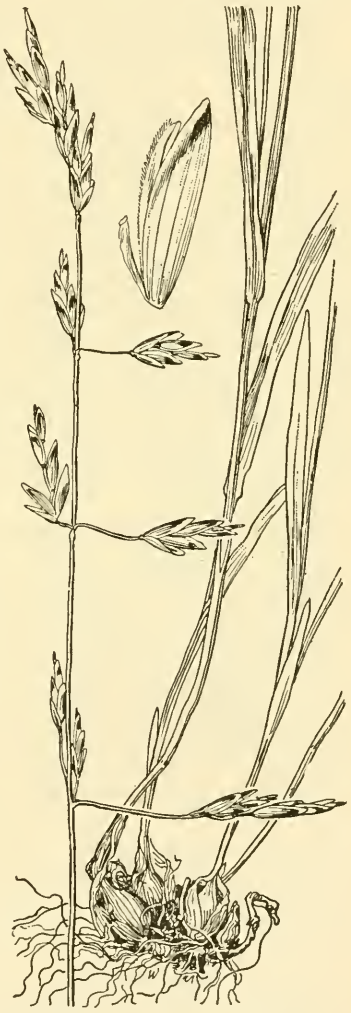

FIGURE 386.—*Melica fugax.* Plant, × 1; floret, × 5. (Vasey 9, Wash.)

stiffly ascending-spreading, in anthesis the lower as much as 5 cm long; spikelets somewhat inflated, 12 to 20 mm long, pale green; glumes scabrous on the strong nerves; lemmas strongly nerved, scabrous, acutish. 2↓ — California (Yosemite National Park and Mount Shasta), Washington (Chelan County, the sheaths and blades pubescent).

FIGURE 387.—Distribution of *Melica fugax*.

10. Melica stricta Boland. ROCK MELIC. (Fig. 389.) Culms 15 to 50 cm tall, densely tufted, the base somewhat thickened but not bulbous; sheaths scaberulous, sometimes pubescent; blades mostly 1 to 3 mm wide, scabrous, pubescent on the upper surface; panicle narrow, simple or with 1 or 2 short branches at base; spikelets 12 to 16 mm long, 4- or 5-flowered, broadly V-shaped, reflexed on capillary pedicels, falling entire; glumes thin, shining, nearly as long as the spikelet; lemmas faintly nerved, scabrous, obtuse. 2↓ —Rocky slopes and banks, at medium altitudes, Utah (Cottonwood Canyon) to Oregon (Steins Mountains), the Sierras, and the mountains of southern California.

11. Melica porteri Scribn. PORTER MELIC. (Fig. 390.) Culms 50 to 100 cm tall, tufted; sheaths smooth or scabrous; blades 2 to 5 mm wide; panicle green or tawny, narrow, 1-sided, 15 to 20 cm long, the branches short, appressed, few-flowered; spikelets 10 to 15 mm long, 4- or 5-flowered, narrow, reflexed on capillary pubescent pedicels, falling entire; glumes less than 1 cm long, shorter than the spikelet; lemmas with 5 strong nerves and several faint ones, scaberulous. 2↓ —Canyons, open woods, and moist places, mostly at 2,000 to 3,000 m, western Missouri (Jackson County); Nebraska to Texas and Arizona (fig. 391).

FIGURE 388.—*Melica inflata*. Plant, × 1; floret, × 5. (Hall and Babcock 3334, Calif.)

12. Melica mutica Walt. TWO-FLOWER MELIC. (Fig. 392.) Culms 60 to 100 cm tall, erect, loosely tufted; sheaths scabrous or somewhat pubescent; blades flat, 2 to 5 mm wide; panicle 10 to 20 cm long, nearly simple, with 1 to few short, spreading, few-flowered

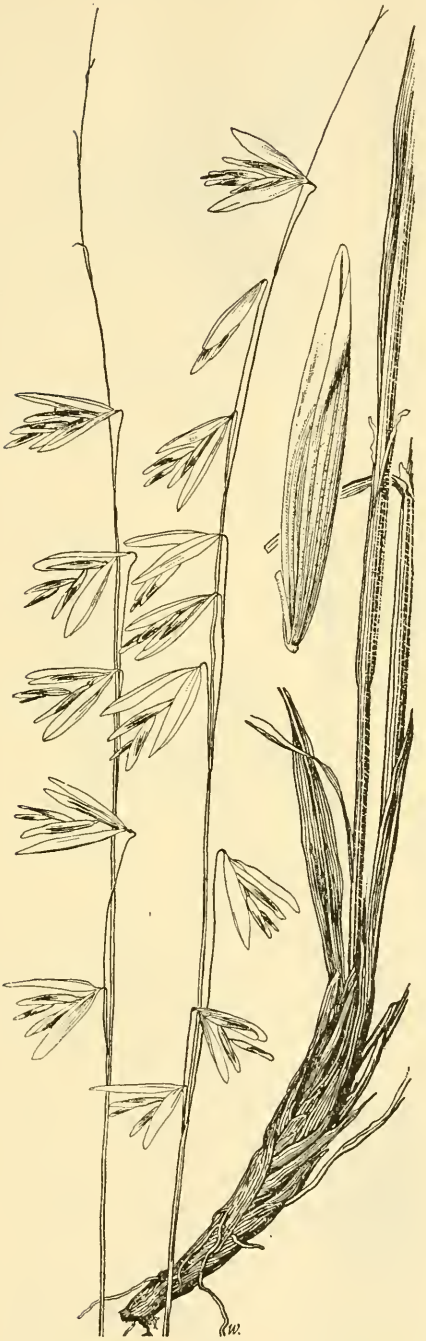

FIGURE 389.—*Melica stricta*. Plant, × 1; floret, × 5. (Swallen 720, Calif.)

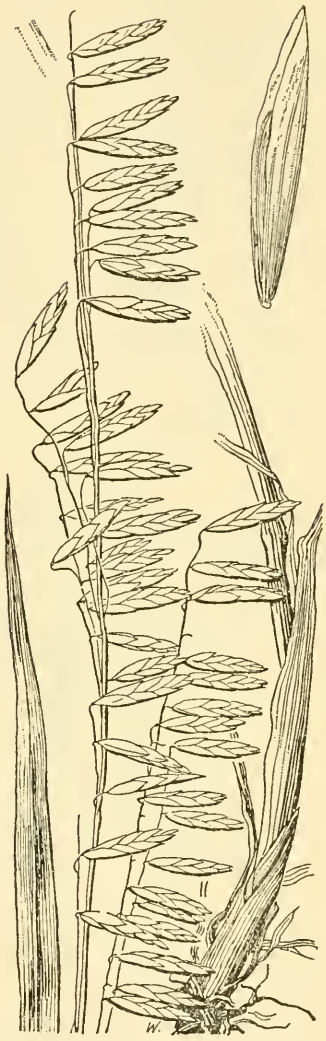

FIGURE 390.—*Melica porteri*. Plant, × 1; floret, × 5. (Shear 726, Colo.)

FIGURE 391.—Distribution of *Melica porteri*.

FIGURE 392.—*Melica mutica*. Plant, × ½; spikelet and floret, × 5. (Chase 3695, Va.)

branches below; spikelets broad, pale, 7 to 10 mm long, usually 2-flowered, the florets spreading, pendulous on slender pedicels, pubescent at the summit, the spikelets falling entire; glumes nearly as long as the spikelet; lemmas scaberulous, strongly nerved, the two florets about the same height; rudiment obconic. 2l —Rocky woods, Maryland to Iowa, south to Florida and Texas (fig. 393).

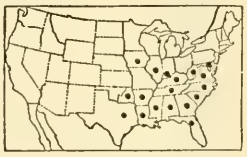

FIGURE 393.—Distribution of *Melica mutica*.

13. Melica nítens (Scribn.) Nutt. THREE-FLOWER MELIC. (Fig. 394.) Resembling *M. mutica;* on the average culms taller; sheaths glabrous or scabrous; blades 7 to 15 mm wide; panicle more compound with several spreading branches; glumes shorter than the usually 3-flowered narrower spikelet; apex of the second floret a little higher than that of the first; lemmas acute. 2l —Rocky woods, Pennsylvania to Iowa and Kansas, south to Kentucky, Arkansas, Texas, and Arizona (fig. 395).

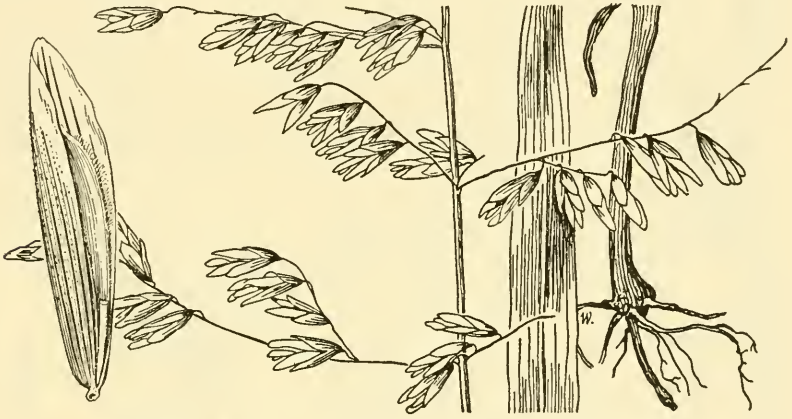

FIGURE 394.—*Melica nitens*. Plant, × 1; floret, × 5. (McDonald 15, Ill.)

14. Melica torreyána Scribn. TORREY MELIC. (Fig. 396.) Culms 30 to 100 cm tall, ascending from a loose decumbent not bulbous base; blades lax, 1 to 3 mm wide; panicle narrow, rather loose, 8 to 20 cm long, the branches more or less fascicled, appressed or ascending, the lower fascicles distant; spikelets 4 to 6 mm long, with 1 or 2 perfect florets and a minute obovoid, long-stiped rudiment; glumes strongly nerved, as long as the spikelet or nearly so; lemmas pubescent, subacute. 2l —Thickets and banks at low altitudes, central California, especially in the Bay region.

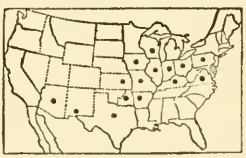

FIGURE 395.—Distribution of *Melica nitens*.

15. Melica imperfécta Trin. CALIFORNIA MELIC. (Fig. 397.) Resembling *M. torreyana;* culms erect or ascending; the base sometimes decumbent or stoloniferous; panicle 5 to 30 cm long, the lower branches commonly ascending to spreading; spikelets usually with 1 perfect floret and an oblong, short-stiped rudiment appressed to the palea; glumes

indistinctly nerved; lemma a little longer than the glumes, glabrous, indistinctly nerved, obtuse. ♃ —Dry open woods and rocky hillsides, at low and medium altitudes, central and southern California, especially in the Coast Ranges; Baja California. A few forms have been distinguished as varieties: MELICA IMPERFECTA var. REFRÁCTA Thurb. Lower branches of panicle spreading or reflexed; blades pubescent. ♃ —Southern California. MELICA IMPERFECTA var. FLÉXUOSA Boland. Like the preceding but blades glabrous. ♃ —Central and southern California. MELICA IMPERFECTA var. MÍNOR Scribn. Culms less than 30 cm tall; blades glabrous, 1 to 2 mm wide. —Southern California.

FIGURE 396.—*Melica torreyana*. Panicle, × 1; floret, × 5. (Chase 5686, Calif.)

16. Melica frutéscens Scribn. (Fig. 398.) Culms 0.75 to 2 m tall, sparingly branching, rather woody below, not bulbous at base; sheaths retrorsely scabrous; blades rather firm, 2 to 4 mm wide, those of the innovations, 1 to 2 mm wide, subinvolute; panicle silvery-shining, narrow, rather dense, 10 to 30 cm long, the branches short, appressed; spikelets short-pediceled, 12 to 15 mm long; glumes nearly as long as the spikelet, prominently 5-nerved; lemmas subacute, faintly 7-nerved. ♃ —Hills and canyons, at low and medium altitudes, southern California (Inyo County and southward); Baja California.

17. Melica califórnica Scribn. (Fig. 399.) Culms 60 to 120 cm tall, the base usually decumbent, often more or less bulbous; sheaths glabrous or pubescent, the lower persistent, brown and shredded; blades 1 to 4 mm wide; panicle narrow, rather dense, 10 to 20 cm long, tawny to purplish, not silvery; spikelets short-pediceled, 10 to 12 mm long (rarely shorter) with 2 to 4 florets besides the rudiment; glumes scaberulous, a little shorter than the spikelets; lemmas rather prominently 7-nerved, scaberulous, subacute to obtuse, often emarginate. ♃ (*M. bulbosa* Geyer; Thurb., not *M. bulbosa* of this work.)—Mountain meadows and rocky woods, at low and medium altitudes, Oregon (Malheur County) and California.

FIGURE 397.—*Melica imperfecta*. Panicle, × 1; spikelet, × 5. (Elmer 4710, Calif.)

MELICA ALTÍSSIMA L. Tall perennial; blades 15 to 20 cm long, 5 to 10 mm wide; panicle narrow, dense, tawny to purple; spikelets about 12 mm long; glumes and lemmas broad, papery. ♃ —Sometimes cultivated for ornament. Eurasia.

MELICA CILIÁTA L. Panicle pale, narrow, condensed, silky. ♃ —Occasionally cultivated for ornament. Europe.

29. SCHIZÁCHNE Hack.

Spikelets several-flowered, disarticulating above the glumes and between the florets, the rachilla glabrous; glumes unequal, 3- and 5-nerved; lemmas lanceolate, strongly 7-nerved, long-pilose on the callus, awned from just below the teeth of the prominently bifid apex; palea with softly pubescent, thickened submarginal keels, the hairs longer toward the summit. Rather tall perennial with simple culms and open rather few-flowered panicles. Type species, *Schizachne fauriei* Hack. (*S. purpurascens*). Name from Greek *schizein*, to split, and *achne*, chaff, alluding to the bifid lemma.

1. Schizachne purpurascens (Torr.) Swallen. FALSE MELIC. (Fig. 400.) Culms erect from a loosely tufted decumbent base, 50 to 100 cm tall; sheaths closed; blades flat, narrowed at the base, 1 to 5 mm wide; panicle about 10 cm long, the branches single or in pairs, more or less drooping, bearing 1 or 2 spikelets; spikelets 2 to 2.5 cm long; glumes purplish, less than half as long as the spikelet; lemmas about 1 cm long, the awn as long as the lemma or longer. 2|. (*Melica striata* Hitchc.; *M. purpurascens* Hitchc.; *Avena torreyi* Nash.)—Rocky woods, Newfoundland to southern Alaska, south to Pennsylvania, Kentucky, South Dakota, and Montana, and in the mountains from British Columbia to New Mexico (fig. 401); Siberia and Japan.

FIGURE 399.—*Melica californica*. Plant, × 1; floret, × 5. (Hoffman 37, Calif.)

FIGURE 398.—*Melica frutescens*. Plant, × 1; floret, × 5. (Munz, Johnston, and Harwood 4143, Calif.)

30. VASEYÓCHLOA Hitchc.

Spikelets subterete or slightly compressed, several-flowered, the rachilla disarticulating above the glumes and between the florets, the joints very short; glumes rather firm, unequal, much shorter than the lemmas, the first 3- to 5-nerved, the second 7- to 9-nerved; lemmas rounded on the back, firm, closely imbricate, 7- to 9-nerved, broad, narrowed to an obtuse entire apex, and with a stipelike hairy callus, pubescent on the lower part of the back and margins; palea shorter than the lemma, splitting at maturity, the

FIGURE 400.—*Schizachne purpurascens.* Plant, × ½; lemma, palea, and caryopsis, × 5. (Chase 7444, N.Y.)

arcuate keels strongly wing-margined; caryopsis concavo-convex, oval, black, the base of the styles persistent as a 2-toothed crown. Slender perennial with elongate blades and somewhat open panicles. Type species, *Vaseyochloa multinervosa.* Named from Vasey and Greek, *chloa*, grass.

1. Vaseyochloa multinervósa (Vasey) Hitchc. (Fig. 402.) Culms erect, loosely tufted, 40 to 100 cm tall, with slender rhizomes; sheaths scaberulous, pilose at the throat; blades flat to loosely involute, 1 to 4 mm wide; panicle narrow, loose, 5 to 20 cm long, the branches few, at first appressed, later spreading, the lower as much as 8 cm long, bearing a few spikelets from about the middle; spikelets 12 to 18 mm long, 6- to 12-flowered, purple tinged; glumes acute, the first narrow, 4 mm long, the second broad, 5 mm long; lemmas narrowed to an obtuse point, about 6 mm long, the nerves becoming rather obscure toward maturity; grain 2.5 to 3 mm long, 1.5 to 2 mm wide, deeply concave on the ventral side. 2↓ (*Melica multinervosa* Vasey; *Distichlis multinervosa* Piper.)—Sandy open woods or open ground, southeastern Texas; rare. The rhizomes appear to break off readily, most herbarium specimens being without them.

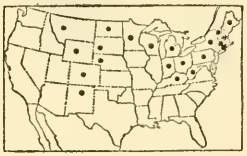

FIGURE 401.—Distribution of *Schizachne purpurascens.*

31. TRIÓDIA R. Br.

(*Tridens* Roem. and Schult.)

Spikelets several-flowered, the rachilla disarticulating above the glumes and between the florets; glumes membranaceous, often thin, nearly equal in length, the first sometimes narrower, 1-nerved, the second rarely 3- to 5-nerved, acute to acuminate; lemmas broad, rounded on the back the apex from minutely emarginate or toothed to deeply and obtusely 2-lobed, 3-nerved, the lateral nerves near the margin, the midnerve usually excurrent between the lobes as a minute point or as a short awn, the lateral nerves often excurrent as minute points, all the nerves pubescent below (subglabrous in one species), the lateral ones sometimes conspicuously so throughout; palea broad, the two nerves near the margin, sometimes villous; grain concavo-convex. Erect, tufted perennials, rarely rhizomatous or stoloniferous, the blades usually flat, the inflorescence an open to contracted or capitate panicle. Type species, *Triodia pungens* R. Br. Name from Greek *tri*, thrice, and *odous*, tooth, referring to the 3-toothed lemma.

In general the species of *Triodia* are of little importance economically, *T. grandiflora*, *T. elongata*, and *T. pilosa* being the most useful on the range. *Triodia pulchella* is often abundant, but is not relished by stock, the little dry plants seldom being eaten.

1a. Panicle capitate, exceeded by fascicles of leaves; low stoloniferous plants. 1. T. PULCHELLA.

1b. Panicle exserted, open or spikelike; plants not stoloniferous.

2a. Panicle open, or loose, not dense or spikelike.

Pedicels of the lateral spikelets less than 1 mm long---- 7. T. LANGLOISII.

Pedicels all slender, more than 1 mm long (some short in *T. buckleyana*).

FIGURE 402.—*Vaseyochloa multinervosa.* Plant, × ½; spikelet and floret, × 5. (Swallen 1854, Tex.)

Lateral nerves not excurrent.
Spikelets not more than 5 mm long; lemmas 2 mm long. 8. T. ERAGROSTOIDES.
Spikelets 6 to 8 mm long; lemmas 4 to 5 mm long--5. T. BUCKLEYANA.
Lateral nerves excurrent as short points.
Rhizomes present, scaly and creeping---------- 6. T. DRUMMONDII.
Rhizomes wanting.
Panicle 5 to 15 cm long; blades 1 to 3 mm wide---- 10. T. TEXANA.
Panicle 15 to 30 cm long, the branches viscid; blades 3 to 10 mm wide---------- 9. T. FLAVA.

2b. Panicle narrow, contracted or spikelike, the branches appressed (see also *T. drummondii*).
Panicle dense, oval or oblong, mostly less than 10 cm long.
Lemmas deeply 2-lobed---------- 2. T. GRANDIFLORA.
Lemmas minutely notched, not lobed.
Panicle 1 to 2 cm long; lemma margins densely long-ciliate; palea half as long as the lemma---------- 3. T. PILOSA.
Panicle 4 to 10 cm long; lemma margins short-pilose near base; palea about as long as the lemma---------- 4. T. CONGESTA.
Panicle slender, spikelike (long and dense in *T. stricta*).
Lemmas glabrous. Panicle whitish---------- 12. T. ALBESCENS.
Lemmas pilose on the margins.
Lemmas mucronate; panicle dense---------- 11. T. STRICTA.
Lemmas not mucronate (rarely lowest lemma obscurely so); panicle not dense.
Glumes acuminate, longer than the lowest floret; blades mostly flat, some of them 2 to 4 mm wide---------- 14. T. ELONGATA.
Glumes obtuse, short; blades mostly folded or involute, mostly about 1 mm wide---------- 13. T. MUTICA.

1. Triodia pulchélla H.B.K. FLUFFGRASS. (Fig. 403.) Low, tufted, usually not more than 15 cm high; culms slender, scabrous or puberulent, consisting of 1 long internode, bearing at the top a fascicle of narrow leaves, the fascicle finally bending over to the ground, taking root and producing other culms, the fascicles also producing the inflorescence; sheaths striate, papery-margined, pilose at base; blades involute, short, scabrous, sharp-pointed; panicle capitate, usually not exceeding the blades of the fascicle, consisting of 1 to 5 nearly sessile relatively large white woolly spikelets; glumes glabrous, subequal, broad, acuminate, awn-pointed, 6 to 8 mm long, nearly as long as the spikelet; lemmas 4 mm long, conspicuously long-pilose below, cleft about halfway, the awn scarcely exceeding the obtuse lobes, divergent at maturity. ♃ (*Dasyochloa pulchella* Willd.; *Tridens pulchellus* Hitchc.)—Mesas and rocky hills, especially in arid or semiarid regions, Texas to Nevada and southern California to southern Mexico (fig. 404).

2. Triodia grandiflóra Vasey. SHORTLEAF TRIODIA. (Fig. 405.) Culms densely tufted, erect or geniculate below, 10 to 50 cm tall, often pubescent at the nodes; blades flat or folded, rather firm, white-margined, appressed-pubescent, 1 to 2 mm wide, those of the culm less than 10 cm long; panicle dense, oblong, pale or sometimes purplish, 2 to 6 cm long, cleistogamous spikelets borne in the lower sheaths; spikelets 4- to 8-flowered, 5 to 12 mm long; glumes acuminate, about as long as the first floret; lemmas 4 to 6 mm long, conspicuously long-pilose on the margins, densely pilose on the back below, deeply lobed, the awn as long as the lobes, or exceeding them. ♃—Rocky slopes, western Texas to southern Arizona and northern Mexico. This has been referred to *T. avenacea* H.B.K., a Mexican species with stolons and shorter purple panicles.

FIGURE 403.—*Triodia pulchella*. Plant, × ½; spikelet and floret, × 5. (Chase 5511, Ariz.)

3. Triodia pilósa (Buckl.) Merr. HAIRY TRIODIA. (Fig. 406.) Culms erect, densely tufted, 10 to 30 cm tall, usually only 1 node showing, the tufts easily pulled up; sheaths pilose at the throat; blades 1 to 1.5 mm wide, flat or folded, mostly in a short basal cluster, somewhat pilose, the margins thick, white, the culm blades 1 to 2 cm long; panicle long-exserted, ovoid, 1 to 2 cm long, pale or purplish, of 3 to 10 large short-pediceled spikelets; spikelets 6- to 12-flowered, 1 to 1.5 cm long, compressed, glumes about two-thirds as long as the lower florets; lemmas about 6 mm long, densely pilose toward the base, pilose on the margin toward the tip, acute, minutely 2-toothed, the awn 1 to 2 mm long; palea half as long as the lemma, pilose on the back and margins below. 2↓ (*Triodia acuminata* Vasey; *Tricuspis pilosa* Nash; *Erioneuron pilosum* Nash.)—Plains and rocky hills, western Kansas to Nevada, south to Texas, Arizona, and central Mexico (fig. 407).

FIGURE 404.—Distribution of *Triodia pulchella.*

FIGURE 405.—*Triodia grandiflora.* Plant, × ½; floret, × 5. (Eggleston 10973, Ariz.)

FIGURE 406.—*Triodia pilosa.* Plant, × ½; floret, × 5. (Griffiths 6427, Tex.)

4. Triodia congésta (L. H. Dewey) Bush. (Fig. 408.) Culms erect, tufted, 30 to 60 cm tall; blades flat, 2 to 3 mm wide, tapering to a fine point; panicle mostly dense, pale or pinkish, 4 to 10 cm long, sometimes interrupted below; spikelets rather turgid, 6- to 12-flowered, 5 to 10 mm long; lemmas 3 to 4 mm long, broad, obtuse, short-pilose on the midnerve and margin below, the apex slightly notched, the awn less than 1 mm long; palea about as long as the lemma, broad, abruptly bowed out below. 2↓ (*Tridens congestus* Nash.)—Sandy or dry plains, southern Texas.

FIGURE 407.—Distribution of *Triodia pilosa.*

5. Triodia buckleyána (L. H. Dewey) Vasey. (Fig. 409.) Culms erect, tufted, 30 to 60 cm tall; sheaths, scaberulous, sometimes sparsely pilose; blades flat, 1 to 3 mm wide, tapering to a fine point; panicle 10 to 20 cm long, the few branches distant, ascending to spreading, as much as 7 cm long; spikelets pale to dark purple, short-pediceled, appressed, rather few and somewhat distant along the simple branches, 3- to 5-flowered, 6 to 8 mm long; glumes slightly shorter than the lower florets; lemmas

4 to 5 mm long, pubescent on the callus and on the lower two-thirds of the midnerve and margin, the apex obtuse, entire, the midnerve not or scarcely excurrent; palea a little shorter than the lemma, pubescent along the margins; grain elliptic, 3 mm long. 2↓ (*Tridens buckleyanus* Nash.)—Rocky wooded slopes, southern Texas.

FIGURE 408.—*Triodia congesta*. Panicle, × 1; floret, × 5. (Tracy 8879, Tex.)

6. Triodia drummóndii Scribn. and Kearn. (Fig. 410.) Culms slender, erect, 1 to 1.5 m tall, with creeping scaly rhizomes; sheaths glabrous or the lower pubescent; blades flat, elongate, 2 to 7 mm wide; panicle purplish, narrow, rather loose, nodding, 10 to 20 cm long, the branches appressed or narrowly ascending; spikelets short-pediceled, 3- to 5-flowered, 7 to 10 mm long; glumes broad, mucronate from a notched apex; lemmas about 5 mm long, pilose on the callus and on the lower half of the midnerve and margins, the summit lobed, the 3 nerves excurrent less than 1 mm; palea glabrous, a little shorter than the lemma, bowed out below. 2↓ (*Tridens drummondii* Nash.)—Sandy woods, Coastal Plain, South Carolina to Florida and Louisiana (fig. 411).

7. Triodia langloísii (Nash) Bush. (Fig. 412.) Culms slender, erect, 60 to 100 cm tall; blades flat or loosely involute, 1 to 5 mm wide; panicle open, ovoid, pale or purplish, 8 to 20 cm long, the branches ascending, 3 to 8 cm long; spikelets short-pediceled (pedicels less than 1 mm) along the simple branches, 4- to 7-flowered, 4 to 6 mm long, nearly as broad, the florets crowded; glumes broad, subacute; lemmas 3 to 4 mm long, mucronate from a minutely lobed apex, the lateral nerves scarcely or barely exserted, pilose on the midnerve and margins on the lower half; palea nearly as long as the lemma, the keels bowed out below. 2↓ (*T. ambigua* Benth., not R. Br.; *Tridens ambiguus* Schult.)—Wet pine barrens, on the coast, South Carolina to Florida and Texas (fig. 413). Plants of the Atlantic Coast (*Triodia elliottii* Bush) mostly have smaller spikelets with shorter lemmas than those of the Gulf region (*T. langloisii*), but there are numerous intergrades throughout the range.

FIGURE 409.—*Triodia buckleyana*. Panicle, × 1; floret, × 5. (Tharp 2996, Tex.)

8. Triodia eragrostoides Vasey and Scribn. (Fig. 414.) Culms slender, erect, densely tufted, 50 to 100 cm tall; blades flat, 1 to 4 mm wide, setaceous-tipped; panicle open, 10 to 30 cm long, the branches rather distant, slender, flexuous, spreading or drooping, 5 to 15 cm long, nearly simple, rather few-flowered; spikelets on slender pedicels 1 to 10 mm long, oblong, mostly 6- to 10-flowered, scarcely 5 mm long; glumes acuminate; lemmas about 2 mm long, obtuse, obscurely pubescent along the midnerve on the lower half, the margins pubescent, the midnerve minutely excurrent. 2↓ (*Tridens eragrostoides* Nash.)—Dry ground among shrubs, Florida Keys, Texas, and northern Mexico; Cuba.

FIGURE 410.—*Triodia drummondii.* Plant, × 1; floret, × 5. (Bartlett 3224, Ala.)

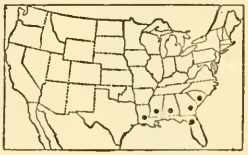

FIGURE 411.—Distribution of *Triodia drummondii.*

9. Triodia fláva (L.) Smyth. PURPLETOP. (Fig. 415.) Culms erect, solitary, tufted, 1 to 1.5 m tall; basal sheaths compressed-keeled; blades elongate, 3 to 10 mm wide, very smooth; panicle open, 15 to 35 cm long, usually purple or finally nearly black, rarely yellowish, the branches distant, spreading to drooping (sometimes shorter and stiffer), naked below, as much as 15 cm long with divergent slender branchlets, the axils pubescent, the axis, branches, branch-

FIGURE 412.—*Triodia langloisii.* Panicle, × 1; floret, × 5. (Curtiss 5020, Fla.)

FIGURE 413.—Distribution of *Triodia langloisii.*

FIGURE 414.—*Triodia eragrostoides.* Panicle, × 1; two views of floret, × 5. (Swallen 1471, Tex.)

FIGURE 415.—*Triodia flava*. Plant, × ½; spikelet and floret, × 5. (Dewey 350, Va.)

lets, and pedicels viscid; spikelets oblong, mostly 6- to 8-flowered, 5 to 8 mm long; glumes subacute, mucronate; lemmas 4 mm long, obtuse, pubescent on the callus and lower half of keel and margins, the 3 nerves excurrent; palea a little shorter than the lemma, somewhat bowed out below. 2l (*Tricuspis seslerioides* Torr.; *Tridens seslerioides* Nash; *Tridens flavus* Hitchc.)—Old fields and open woods, New Hampshire to Nebraska, south to Florida and Texas (fig. 416). The type specimen is the rare form with yellowish panicle. In some Florida specimens the excurrent nerves of the lemma are as much as 1 mm long.

FIGURE 416.—Distribution of *Triodia flava*.

FIGURE 417.—*Triodia texana*. Panicle, × 1; floret, × 5. (Wooton, Tex.)

10. Triodia texána S. Wats. (Fig. 417.) Culms erect, densely tufted, 20 to 40 cm tall; sheaths pubescent at throat and collar; blades flat or subinvolute, 1 to 4 mm wide, tapering to a slender point; panicle open, 5 to 15 cm long, nodding, the branches rather distant, flexuous, drooping, few-flowered; spikelets oblong, 6- to 10-flowered, 6 to 10 mm long, rather turgid, pink or purplish, more or less nodding on short pedicels; glumes broad, acute to obtuse; lemmas 4 to 5 mm long, obtuse, minutely lobed, the margins densely pilose near the base, the keel glabrous or sparsely pilose below, the 3 nerves short-excurrent; palea about as long as the lemma, strongly bowed out at base. 2l (*Tridens texana* Nash.)—Plains and dry slopes, central and southern Texas, and northern Mexico.

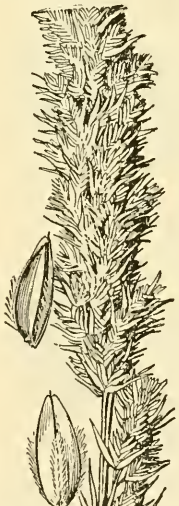

FIGURE 418.—*Triodia stricta*. Panicle, × 1; two views of floret, × 5. (Newlon, Kans.)

FIGURE 419.—Distribution of *Triodia stricta*.

11. Triodia strícta (Nutt.) Benth. (Fig. 418.) Culms rather stout, erect, 1 to 1.5 m tall; blades elongate, flat or loosely involute, 3 to 8 mm wide; panicle dense, spikelike, more or less interrupted below, narrowed above, 10 to

30 cm long; spikelets short-pediceled, 4- to 6-flowered, about 5 mm long, the florets closely imbricate; glumes as long as the spikelet, or nearly so, the apex spreading, the keel glandular-viscid toward maturity; lemmas about 3 mm long, obtuse, the keel and margins pilose on the lower half to two-thirds, the midnerve excurrent as a minute awn; palea about as long as the lemma, short-ciliate on the sharp keels, not strongly bowed out. 2↓ (*Tricuspis stricta* A. Gray; *Tridens strictus* Nash.)—Low moist ground and low woods, Tennessee, Missouri, and Kansas to Alabama and Texas (fig. 419).

FIGURE 420.—*Triodia albescens.* Panicle, × 1; two views of floret, × 5. (Ball 1652, Tex.)

FIGURE 421.—Distribution of *Triodia albescens.*

12. Triodia albéscens Vasey. WHITE TRIODIA. (Fig. 420.) Culms erect, tufted, 30 to 80 cm tall; blades flat to loosely involute, elongate, 2 to 4 mm wide, tapering to a fine point; panicle narrow, rather dense, greenish to nearly white, 10 to 20 cm long; spikelets short-pediceled, 8- to 12-flowered, 5 to 7 mm long, the florets closely imbricate; glumes a little longer than the first lemma, subacute; lemmas 3 mm long, obscurely pubescent on the callus, otherwise glabrous, obtuse, the midnerve minutely or not at all excurrent; palea a little shorter than the lemma, bowed out below. 2↓ (*Rhombolytrum albescens* Nash.)—Plains and open woods, Kansas and Colorado to Texas and New Mexico; northern Mexico (fig. 421).

13. Triodia mútica (Torr.) Scribn. SLIM TRIODIA. (Fig. 422.) Culms slender, densely tufted, 30 to 50 cm tall; sheaths and blades scaberulous, the sheaths usually loosely pilose, more densely so at the summit; blades flat or subinvolute, 1 to 3 mm wide, sometimes sparsely pilose; panicle narrow, rather dense, interrupted, the branches short, appressed; spikelets 6- to 8-flowered, about 1 cm long, pale to purplish, nearly terete; glumes scaberulous, about as long as the lower florets; lemmas about 5 mm long, densely pilose on the lower half of the nerves and on the callus, obtuse, entire or minutely notched, the midnerve not exserted; palea half or two-thirds as long as the lemma, densely pilose on the keels and puberulent on the back. 2↓ (*Tridens muticus* Nash.)—Plains and rocky slopes, Arkansas and Texas to southeastern California, north to Nevada, Utah, and Colorado (fig. 423).

FIGURE 423.—Distribution of *Triodia mutica.*

FIGURE 422.—*Triodia mutica.* Panicle, × 1; two views of floret, × 5. (Chase 5902, Tex.)

14. Triodia elongáta (Buckl.) Scribn. ROUGH TRIODIA. (Fig. 424.) Culms erect, tufted, 40 to 80 cm tall; sheaths and blades scaberulous, sometimes sparsely pilose, the blades mostly flat, 2 to 4 mm wide, tapering to a fine point; panicle elongate, erect, pale or purple tinged, loosely flowered, 10 to 25 cm long, the branches rather distant, appressed, scarcely or not at all overlapping; spikelets similar to those of *T. mutica*, the glumes longer, the hairs on the florets not so long. 2l (*Tridens elongatus* Nash; *Tricuspis elongata* Nash.)—Plains, sandy prairies, and rocky slopes, Missouri and Kansas to Texas and Arizona (fig. 425).

FIGURE 424.—*Triodia elongata*. Panicle, × 1; two views of floret, × 5. (Ball 1535, Tex.)

32. TRÍPLASIS Beauv.

Spikelets few-flowered, V-shaped, the florets remote, the rachilla slender, disarticulating above the glumes and between the florets; glumes nearly equal, smooth, 1-nerved, acute; lemmas narrow, 3-nerved, 2-lobed, the nerves parallel, silky-villous, the lateral pair near the margin, the midnerve excurrent as an awn, as long as the lobes or longer; palea shorter than the lemma, the keels densely long-villous on the upper half. Slender tufted annuals or perennials, with short blades, short, open, few-flowered purple terminal panicles and cleistogamous narrow panicles in the axils of the leaves. Both species, have, in addition to the small panicles of cleistogamous spikelets in the upper sheaths, additional cleistogamous spikelets, reduced to a single large floret, at the bases of the lower sheaths. The culms break at the nodes, these mature cleistogenes remaining within the sheaths. Type species, *Triplasis americana*. Name from Greek *triplasios*, triple, alluding to the awn and the two subulate lobes of the lemma. The species are of no importance except as they tend to hold sandy soil.

Lobes of lemma not subulate-pointed; awn shorter than the lemma; annual.
1. T. PURPUREA.

Lobes of lemma subulate-pointed; awn longer than the lemma; perennial.
2. T. AMERICANA.

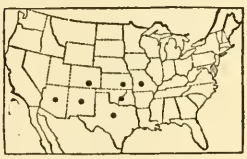

FIGURE 425.—Distribution of *Triodia elongata*.

1. Triplasis purpúrea (Walt.) Chapm. (Fig. 426, *A*.) Annual, often purple; culms ascending to widely spreading, pubescent at the several to many nodes, 30 to 75 cm tall; blades flat or loosely involute, 1 to 3 mm wide, mostly 4 to 8 cm long; panicle 3 to 5 cm long, with few spreading few-flowered branches, the axillary more or less enclosed in the sheaths; spikelets short-pediceled, 2- to 4-flowered, 6 to 8 mm long; lemmas 3 to 4 mm long, the lobes broad, rounded or truncate, the nerves and callus densely short-villous, the awn about as long as the lobes

FIGURE 426.—*A*, *Triplasis purpurea*. Plant, × ½; spikelet, floret, and cleistogamous spikelet, × 5. (Commons 255, Del.) *B*, *T. americana*. Panicle, × 1; floret, × 5. (Curtiss 5570, Fla.)

or somewhat exceeding them; palea conspicuously silky-villous on the upper half of the keels; grain about 2 mm long. ⊙ — Dry sand, New Hampshire to Minnesota and Nebraska, south to Florida and Texas (fig. 427). In autumnal culms the numerous short joints with sheaths swollen at the base, containing cleistogenes, are conspicuous. Plants with awns exceeding the lobes of the lemma have been differentiated as *T. intermedia* Nash.

2. Triplasis americána Beauv. (Fig. 426, *B.*) Perennial; culms slender, tufted, mostly erect, 30 to 60 cm tall; blades flat or subinvolute,

FIGURE 427.—Distribution of *Triplasis purpurea.*

FIGURE 428.—Distribution of *Triplasis americana.*

mostly 15 to 18 cm long; panicle 2 to 5 cm long, the few slender ascending branches with 1 or 2 spikelets; spikelets mostly 2- or 3-flowered, about 1 cm long; lemmas 5 to 6 mm long, the lobes about half as long as the entire lemma, subulate-pointed, the nerves with a narrow stripe of silky hairs, the awn 5 to 8 mm long, pubescent below; keels of the palea long-villous, the hairs erect. ♃ —Dry sand, Coastal Plain, North Carolina to Florida and Mississippi (fig. 428).

33. ANTHÓCHLOA Nees

Spikelets few-flowered, subsessile, imbricate on a simple axis, the rachilla disarticulating above the glumes and between the florets; glumes (in our species) wanting; lemmas thin-membranaceous, flabelliform, whitish, petallike, many-nerved; palea narrower than the lemma, hyaline. Low annuals or perennials, with soft dense cylindric panicles. Type species, *Anthochloa lepidula* Nees. Name from Greek *anthos*, flower, and *chloa*, grass, alluding to the flowerlike appearance of the inflorescence.

1. Anthochloa colusána (Davy) Scribn. (Fig. 429.) Annual; culms ascending from a decumbent base, 7 to 30 cm long; leaves overlapping, pale green, scarious between the nerves, loosely folded around the culm, not differentiated into sheath and blade, about 12 mm wide at the middle, tapering to each end, 5 to 10 cm long, keeled on the back above, plicate, minutely ciliate, with raised glands on the margins and nerves; panicle pale green, at first partly included, never much exserted, 3 to 7 cm long, 8 to 12 mm wide, the upper part of the axis bearing, instead of spikelets, lanceolate-linear empty bracts 8 mm long; spikelets subsessile, usually 5-flowered, 6 to 7 mm long, imbricate; glumes wanting; lemmas flabellate, very broad, many-nerved, 5 mm long, ciliolate-fringed. ⊙ —Known only from "near Princeton, Colusa County, Calif., bordering rain-pools on the hard uncultivated alkali 'goose-lands,' beside the stage road to Norman." Region now in rice culture.

34. ORCÚTTIA Vasey

Spikelets several-flowered, the upper florets reduced; rachilla persistent, continuous, the florets falling away, or tardily disarticulating; glumes nearly equal, shorter than the lemmas, broad, irregularly 2- to 5-toothed, many-nerved, the nerves extending into the teeth; lemmas firm, prominently 13- to 15-nerved, the broad summit toothed; palea broad, as long as the lemma. Low tufted annuals, with short blades and solitary spikes or spikelike racemes, the subsessile spikelets relatively large, the upper aggregate, the lower more or less remote. Type species, *Orcuttia californica*. Named for C. R. Orcutt.

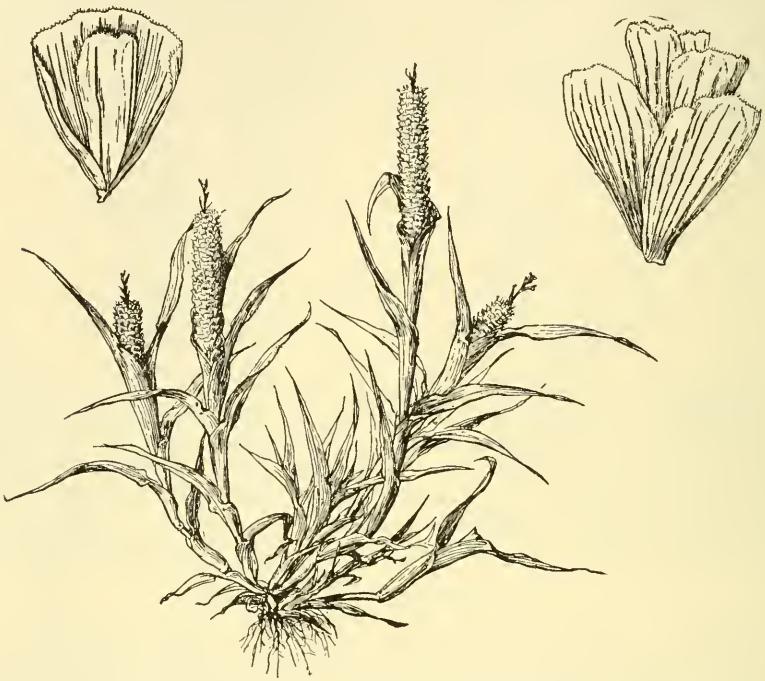

FIGURE 429.—*Anthochloa colusana*. Plant, × ½; spikelet and floret, × 5. (Type.)

FIGURE 430.—*Orcuttia greenei*. Spikelet, × 5. (Type.)

Lemmas with 7 to 11 short teeth ..... 1. O. GREENEI.
Lemmas with 5 awn-tipped teeth.
  Blades filiform, glabrous ..... 2. O. TENUIS.
  Blades flat, 1.5 to 3 mm wide, pilose .... 3. O. CALIFORNICA.

1. Orcuttia greénei Vasey. (Fig. 430.) Culms 15 to 20 cm tall, suberect; blades 2 to 3 cm long, subinvolute; raceme 3 to 7 cm long, pale; spikelets 10 to 15 mm long, loosely papillose-pilose; glumes 4 to 5 mm long; lemmas 6 mm long, the obtuse or truncate tip spreading, 7- to 11-toothed, the teeth mucronate but not awned. ⊙ —Known only from moist plains of the upper Sacramento near Chico, Calif.

2. Orcuttia ténuis Hitchc. (Fig. 431.) Culms in small tufts, slender, erect, 5 to 12 cm tall; leaves mostly basal, the blades firm,

strongly nerved, filiform, 1 to 2 cm long; raceme more than half the entire height of the plant, the lower spikelets distant, the upper approximate but not crowded; spikelets purple-tinged, 12 to 15 mm long, the rachilla joints pubescent; glumes and lemmas scabrous, sometimes with a few hairs toward the base of the lemmas; glumes 3 to 4 mm long, sharply toothed; lemmas 5 mm long, 5-toothed, the teeth acuminate, awn-tipped, the rigid tips spreading or slightly recurved. ⊙ —Known only from sandy open ground, Goose Valley, Shasta County, Calif.

3. Orcuttia californica Vasey. (Fig. 432.) Culms 5 to 15 cm long, spreading with ascending ends, forming little mats; foliage thin, pilose, the sheaths loose, the blades 2 to 4 cm long; raceme loose below,

FIGURE 431.—*Orcuttia tenuis*. Plant, × ½; spikelet and floret, × 5. (Type.)

FIGURE 432.—*Orcuttia californica*. Panicle, × 1; floret, × 5. (Munz 10804, Calif.)

dense or subcapitate at the summit; spikelets 8 to 12 mm long, densely to sparsely pilose; glumes sharply-toothed; lemmas about 6 mm long, deeply cleft into 5 awn-tipped teeth. ⊙ —Drying mudflats, near Murietta, Hot Springs, Riverside County, Calif.; Baja California.

35. BLEPHARIDÁCHNE Hack.

Spikelets compressed, 4-flowered, the rachilla disarticulating above the glumes but not between the florets; glumes nearly equal, compressed, 1-nerved, thin, smooth; lemmas 3-nerved, the nerves extending into awns, deeply 3-lobed, conspicuously ciliate, the first and second sterile, containing a palea but no flower, the third fertile, the fourth reduced to a 3-awned rudiment. Low annuals or perennials, with short, dense, few-flowered panicles scarcely exserted from the

subtending leaves. Type species, *Blepharidachne kingii*. Name from Greek *blepharis* (blepharid-), eyelash, and *achne*, chaff, alluding to the ciliate lemma.

Glumes a little longer than the florets, acuminate; foliage scaberulous. 1. B. KINGII.

Glumes a little shorter than the florets, subacute; foliage densely grayish harsh-puberulent ..... 2. B. BIGELOVII.

1. Blepharidachne kíngii (S. Wats.) Hack. (Fig. 433.) Low tufted perennial with the aspect of *Triodia pulchella*, but not rooting at upper nodes; culms mostly less than 10 cm tall; sheaths with broad hyaline margins; blades less than 1 mm wide, involute, curved, sharp-pointed, 1 to 3 cm long; panicles subcapitate, pale or purplish, 1 to 2 cm long, exceeded by the upper blades; spikelets flabellate; glumes about 8 mm long, acuminate, exceeding the florets; sterile lemmas about 6 mm long, all the lemmas about the same height, long-ciliate on the margins, pilose at the base and on the callus, cleft nearly to the middle, the lateral lobes narrow, obtuse, the nerve at one margin, awn-tipped, the central lobe consisting of the

FIGURE 433.—*Blepharidachne kingii*. Plant, × 1; spikelet and perfect floret, × 5. (Jones 4094, Nev.)

awn, ciliate below, somewhat exceeding the lateral ones; palea much narrower and somewhat shorter than the lemma; fertile lemma similar to the sterile ones, the palea broad and as long as the lemma; upper sterile lemma on a rachilla joint about 3 mm long, reduced to 3 plumose awns; grain compressed, 2 mm long. ♃ —Deserts, Nevada and California (Death Valley), apparently rather rare.

2. Blepharidachne bigelóvii (S. Wats.) Hack. (Fig. 434.) Perennial; culms stiff, 10 to 20 cm long, the culms and foliage harsh-puberulent; sheaths broad, firm; blades coarser than in *B. kingii;* panicles dense, oblong, 1 to 3 cm long, the blades not exceeding the panicle; glumes about 6 mm long, subacute, shorter than the florets; sterile lemmas ciliate and awned as in *B. kingii*, cleft about 1 mm. ♃ —Known only from rocky hills, Frontera, above El Paso, Tex.

36. CÓTTEA Kunth

Spikelets several-flowered, the uppermost reduced, the rachilla disarticulating above the glumes and between the florets; glumes about equal, nearly equaling the lower lemma, with several parallel nerves; lemmas rounded on the back, villous below, prominently 9- to 11-nerved, some of the nerves extending into awns of irregular size and some into awned teeth; palea a little longer than the body of the lemma, the keels near the margin. An erect tufted branching perennial with flat blades and oblong loose panicle. Type species, *Cottea pappophoroides*. Named for Heinrich Cotta.

1. Cottea pappophoroides Kunth. (Fig. 435.) Softly pubescent throughout; culms 30 to 50 cm tall; blades 3 to 7 mm wide; panicle 8 to 15 cm long, the branches loosely ascending; spikelets 4- to 7-flowered, 5 to 7 mm long, about 5 mm wide, green or purplish; glumes 4 to 5 mm long; lemmas 3 to 4 mm long, the basal hairs conspicuous, at least the middle awn spreading. ♃ —Plains and dry hills, western Texas to southern Arizona, south to central Mexico; Ecuador to Argentina. Cleistogamous spikelets, usually reduced to a single floret, are found in the lower sheaths, and often large, very turgid ones at the very base. Not abundant enough to have economic importance.

37. PAPPÓPHORUM Schreb. Pappusgrass

Spikelets 2- to 5-flowered, the upper reduced, the rachilla disarticulating above the glumes but not or only tardily between the florets, the internodes very short; glumes nearly equal, keeled, thin-membranaceous, as long as the body of the florets or longer, 1- to several-nerved, acute; lemmas rounded on the back, firm, obscurely many-nerved, dissected above into numerous spreading awns, the florets falling together, the awns of all forming a pappus-like crown; palea as long as the body of the lemma, the nerves near the margin. Erect tufted perennials, with narrow or spikelike whitish to tawny or purplish panicles. Type species, *Pappophorum alopecuroideum* Vahl. Name from Greek *pappos*, pappus, and *phoros*, bearing, alluding to the pappus-like crown of the lemma. Our species are of minor economic importance, though the first two may constitute a fair proportion of the forage on sterile hills.

FIGURE 434.—*Blepharidachne bigelovii*. Plant, × 1; fertile floret, × 5. (Type.)

Awns plumose; panicle plumbeous, usually less than 5 cm long. 1. P. WRIGHTII.
Awns scabrous; panicle tawny to pink, usually more than 5 cm long.
Panicle spikelike, tawny or whitish. 2. P. MUCRONULATUM.
Panicle narrow but rather loose, pinkish. 3. P. BICOLOR.

FIGURE 435.—*Cottea pappophoroides.* Plant, × ½; spikelet, floret, and cleistogene, × 5. (Griffiths 5946, Ariz.)

FIGURE 436.—*Pappophorum wrightii* Plant, × ½; spikelet, perfect floret, and cleistogene, × 5. (Purpus 8272, Ariz.)

FIGURE 437.—*Pappophorum mucronulatum.* Plant, × ½; spikelet and perfect floret, × 5. (Pringle, Ariz.)

SECTION 1. ENNEAPÓGON Trin.

Spikelets 3-flowered, the first floret fertile, the second smaller, sterile, the third rudimentary; awns 9, plumose.

1. Pappophorum wrightii S. Wats. SPIKE PAPPUSGRASS. (Fig. 436.) Culms numerous, slender, decumbent-spreading, 20 to 40 cm tall, the nodes pubescent; blades flat to subinvolute, about 1 mm wide; panicle spikelike, gray-green or drab, mostly 2 to 5 cm long, sometimes interrupted below; glumes 7-nerved; lemma of first floret (including awns) 4 to 5 mm long, the body about 1.5 mm long, villous, 9-nerved, the awns plumose. ♃ —Dry plains and stony hills, Texas to Arizona, south to Oaxaca; Peru and Bolivia. Cleistogamous spikelets are produced in the lower sheaths. The cleistogenes are larger than the normal florets but the awns are almost wanting. The culms disarticulate at the lower nodes carrying the cleistogenes with them.

SECTION 2. POLYRÁPHIS Trin.

Spikelets 4- to 6-flowered, the lower 1 to 3 fertile, the upper reduced or rudimentary; awns more than 9, scabrous.

2. Pappophorum mucronulátum Nees. (Fig. 437.) Culms erect, 60 to 100 cm tall; blades flat to subinvolute, 2 to 5 mm wide; panicle spikelike, tawny or whitish, tapering at summit, 10 to 20 cm long; spikelets short-pediceled with 1 or 2 fertile florets and 2 or 3 sterile reduced ones, the rachilla disarticulating below the fertile floret and tardily above it; glumes 1-nerved; fertile lemma subindurate, the nerves obscure, villous toward base, dissected into numerous unequal awns 2 to 5 mm long, the body about 3 mm long. ♃ (*P. apertum* Munro.)—Low places on plains and in valleys, Texas, Arizona, and northern Mexico; South America; wool waste, Maine.

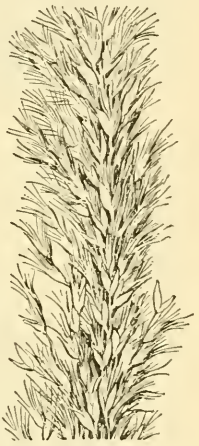

FIGURE 438.—*Pappophorum bicolor*, × 1. (Griffiths 6291, Tex.)

3. Pappophorum bícolor Fourn. (Fig. 438.) Culms erect, 30 to 80 cm tall; blades flat to subinvolute, 1 to 5 mm wide; panicle mostly 10 to 15 cm long, usually pink-tinged, rather loose, the branches 1 to 4 cm long; spikelets on pedicels 1 to 5 mm long, with 2 or 3 fertile florets and 1 or 2 sterile reduced ones, all about the same height in the spikelet, the rachilla not separating between the florets; glumes 1-nerved; lemmas somewhat indurate, obscurely nerved, pilose on the callus and on the lower half to two thirds of the midnerve and margins, dissected into about 12 somewhat unequal scabrous awns 2 to 4 mm long, the body about 3 mm long, the awns about as long. ♃ —Open valley land, Texas, Arizona (La Noria, near Monument 111), and Mexico.

38. SCLEROPÓGON Phil.

Plants monoecious or dioecious. Staminate spikelets several-flowered, pale, the rachilla not disarticulating; glumes about equal, a perceptible internode between, membranaceous, long-acuminate, 1-nerved or obscurely 3-nerved, nearly as long as the first lemma; lemmas similar to the glumes, somewhat distant, 3-nerved or obscurely

FIGURE 439.—*Scleropogon brevifolius*. Pistillate and staminate plants, × ½; pistillate spikelet × 2; pistillate and staminate florets, × 5. (Zuck, Ariz.)

5-nerved, mucronate; palea obtuse, shorter than the lemma. Pistillate spikelets several-flowered, the upper florets reduced to awns, the rachilla disarticulating above the glumes but not separating between the florets or only tardily so; glumes acuminate, 3-nerved, with a few fine additional nerves, the first about half as long as the second; lemmas narrow, 3-nerved, the nerves extending into slender, scabrous, spreading awns, the florets falling together, forming a cylindric many-awned fruit, the lowest floret with a sharp-bearded callus as in *Aristida*; palea narrow, the two nerves near the margin, produced into short awns. A stoloniferous perennial, with short flexuous blades and narrow few-flowered racemes or simple panicles, the staminate and pistillate panicles strikingly different in appearance. Staminate and pistillate panicles may occur on the same plant or rarely the two kinds of spikelets may be found in the same panicle. It may be that the seedlings produce two kinds of branches, each kind then reproducing its own sex. This should be investigated. Type species, *Scleropogon brevifolius*. Name from Greek *skleros*, hard, and *pogon*, beard, alluding to the hard awns.

FIGURE 440.—Distribution of *Scleropogon brevifolius*.

1. Scleropogon brevifólius Phil. BURRO GRASS (Fig. 439.) Culms erect, 10 to 20 cm tall, tufted, producing wiry stolons with internodes 5 to 15 cm long; leaves crowded at the base, the blades flat, 1 to 2 mm wide, sharp-pointed; racemes, excluding awns, 1 to 5 cm long; staminate spikelets 2 to 3 cm long; body of pistillate spikelets 2.5 to 3 cm long, the awns 5 to 10 cm long, loosely twisted. 2↓ (*S. karwinskyanus* Benth.)—Semiarid plains and open valley lands, Texas to Colorado and Arizona, south to central Mexico; Argentina (fig. 440). The mature pistillate spikelets break away and with their numerous long spreading awns form "tumbleweeds" that are blown before the wind, the pointed barbed callus readily penetrating clothing or wool, the combined florets acting like the single floret of long-awned aristidas. Spikelets rarely staminate below and pistillate above. On overstocked ranges, where it tends to become established, it is useful in preventing erosion. Often important as a range grass, especially when young.

TRIBE 3. HORDEAE

39. AGROPŸRON Gaertn. WHEATGRASS

Spikelets several-flowered, solitary (rarely in pairs), sessile, placed flatwise at each joint of a continuous (rarely disarticulating) rachis, the rachilla disarticulating above the glumes and between the florets; glumes equal, firm, several-nerved, rarely 2-nerved, 1-nerved, or nerveless, usually shorter than the first lemma, acute or awned, rarely obtuse or notched; lemmas convex on the back, rather firm, 5 to 7-nerved, acute or awned from the apex; palea about as long as the lemma. Perennials (our species except *Agropyron triticeum*), often with creeping rhizomes, with usually erect culms and green or purplish, usually erect spikes. Type species, *Agropyron triticeum* Gaertn. Name from Greek *agrios*, wild, and *puros*, wheat, the two original species being weeds in wheat fields.

Most of the species of *Agropyron* furnish forage and a few are among the most valuable range grasses of the Western States. In the valleys some species may grow in sufficient abundance to produce hay.

Agropyron pauciflorum (*A. tenerum*) has been cultivated in the Northwestern States on a commercial scale under the name slender wheatgrass and the seed has been carried by seedsmen in that region. *A. smithii,* bluestem, often called also western wheatgrass and sometimes Colorado bluestem, is a source of hay in alkaline meadows through the Western States. *A. spicatum,* or bluebunch wheatgrass, and *A. dasystachyum* are important range grasses in the Northwestern States. *A. pauciflorum* and *A. subsecundum* (*A. caninum,* so-called) because of their abundance in the mountain grazing regions are also important. *A. repens,* quackgrass, is a good forage grass, but, because of its creeping rhizomes, is a troublesome weed, especially in the Eastern States where it is widely introduced. The species with strong creeping rhizomes are valuable for holding embankments or for holding sandy soils.

The divisions of the species into those with rhizomes and those without is convenient and usually definite when the entire base is present but some species normally without rhizomes (as *A. spicatum*) may rarely produce them and species in which rhizomes occur may not show them in herbarium specimens.

1a. Plants with creeping rhizomes.
Lemmas awned, the awn divergent at maturity.
Lemmas pubescent ..... 9. A. ALBICANS.
Lemmas glabrous ..... 10. A. GRIFFITHSII.
Lemmas awnless or with a short straight awn.
Glumes rigid, gradually tapering into a short awn.
Culms 10 to 20 cm tall, usually shorter than the leaves; sandy seacoast, California ..... 4. A. ARENICOLA.
Culms 30 to 60 cm tall, exceeding the leaves; interior ..... 5. A. SMITHII.
Glumes not rigid, acute or abruptly awn-pointed.
Lemmas glabrous (sometimes pubescent in *A. riparium*).
Blades lax, flat, usually sparsely pilose on the upper surface. 2. A. REPENS.
Blades firm, stiff, often involute, not pilose.
Spikelets much compressed, closely imbricate, the spike dense. 3. A. PUNGENS.
Spikelets not much compressed, somewhat distant, the spike slender. 8. A. RIPARIUM.
Lemmas pubescent.
Spike 6 to 12 cm long; spikelets 1 to 1.5 cm long; glumes 6 to 9 mm long. 6. A. DASYSTACHYUM.
Spike longer, as much as 25 cm long; spikelets as much as 2.5 cm long; glumes as much as 13 mm long ..... 7. A. ELMERI.
1b. Plants without creeping rhizomes.
Spikelets much compressed, closely imbricate, divergent ..... 1. A. CRISTATUM.
Spikelets not much compressed nor closely imbricate.
Spikelets awnless or awn-tipped only.
Lemmas pubescent ..... 14. A. LATIGLUME.
Lemmas glabrous.
Internodes of rachilla scaberulous; glumes rather narrow, about half as long as the spikelet.
Blades involute (rarely flat) ..... 19. A. INERME.
Blades flat ..... 21. A. PARISHII.
Internodes of rachilla villous; glumes broad, nearly as long as the spikelet ..... 13. A. PAUCIFLORUM.
Spikelets awned.
Culms prostrate-spreading ..... 17. A. SCRIBNERI.
Culms erect (decumbent at base in *A. pringlei*).
Rachis finally disarticulating.
Glumes narrow, 2-nerved; awns of lemma spreading, out-curved or recurved ..... 22. A. SAXICOLA.
Glumes broader, with usually 3 to 5 distinct scabrous nerves; awn of lemma straight, erect ..... 23. A. SAUNDERSII.

Rachis continuous.
Awn straight or nearly so.
Spikelets about as long as the internodes of the rachis. 21. A. PARISHII.
Spikelets imbricate, longer than the internodes of the rachis.
Lemmas coarsely pubescent 11. A. VULPINUM.
Lemmas glabrous or scabrous toward summit only. 12. A. SUBSECUNDUM.
Awn divergent, when dry.
Spikelets imbricate 15. A. BAKERI.
Spikelets distant.
Spikelets 3 to 7 in a spike, about twice as long as the internode; spike 4 to 7 cm long 16. A. PRINGLEI.
Spikelets mostly more than 7 in a spike, usually shorter than the internode; spikes mostly more than 8 cm long.
Spike 8 to 15 cm long; blades 1 to 2 mm wide. 18. A. SPICATUM.
Spike 15 to 30 cm long; blades 4 to 6 mm wide. 20. A. ARIZONICUM.

1. Agropyron cristátum (L.) Beauv. CRESTED WHEATGRASS. (Fig. 441.) Culms erect, in dense tufts, 60 to 100 cm tall; blades flat; spike dense, mostly 4 to 6 cm long, the internodes of the rachis pubescent, 1 mm long; spikelets compressed, glabrous to villous, closely imbricate, somewhat spreading, 5 to 15 mm long; glumes firm, keeled, tapering into a short awn; lemmas somewhat abruptly narrowed into an awn 2 to 4 mm long 2↓ —Introduced here and there in grainfields (North Dakota, South Dakota, Wyoming, Colorado); Eurasia. This grass is well adapted for hay and pasture in the northern Great Plains from North Dakota to eastern Washington and south to western Kansas and probably will be valuable in the northern parts of New Mexico and Arizona. It spreads readily by reseeding.

FIGURE 441.—*Agropyron cristatum*, × 1. (Ball 1768, Colo.)

Agropyron tritíceum Gaertn. Annual, branching at base; culms slender, erect or usually decumbent, mostly 10 to 30 cm tall; blades flat, mostly less than 10 cm long, 2 to 3 mm wide; spike oval or ovate, 1 to 1.5 cm long, thick; spikelets crowded, about 7 mm long; glumes and lemmas acuminate. ⊙ —Absaroka Forest, Mont.; Mountain Home, Idaho. Sparingly introduced from southern Russia.

2. Agropyron répens (L.) Beauv. QUACKGRASS. (Fig. 442, *A*.) Green or glaucous; culms erect or curved at base, 50 to 100 cm tall, sometimes taller, with creeping yellowish rhizomes; sheaths of the innovations often pubescent; blades relatively thin, flat, usually sparsely pilose on the upper surface, mostly 6 to 10 mm wide; spike 5 to 15 cm long, the rachis scabrous on the angles; spikelets mostly 4- to 6-flowered, 1 to 1.5 cm long, the rachilla glabrous or scaberulous; glumes 3- to 7-nerved, awn-pointed; lemmas mostly 8 to 10 mm long, the awn from less than 1 mm to as long as the lemma; palea obtuse, nearly as long as the lemma, scabrous on the keels. 2↓ —Waste places, meadows and pastures, Newfoundland to Alaska (Skagway), south to North Carolina, Arkansas, New Mexico, and California (fig. 443); introduced from Eurasia. Common in the Northern States; a troublesome weed in cultivated ground. Called also quitch grass and couch grass. Awned specimens have been described as *Agropyron leersianum* (Wulf.) Rydb.

FIGURE 442.—*A*, *Agropyron repens*. Plant, × ½; spikelet and floret, × 3. *B*, *A. pungens*, × 3. (Scribner, Maine.)

3. Agropyron púngens (Pers.) Roem. and Schult. (Fig. 442, *B.*) Glaucous, culms 50 to 80 cm tall, with pale or brownish rhizomes; blades firm, mostly involute, scabrous on the upper surface; spikelets awnless, compressed, often as much as 10-flowered, the florets closely imbricate; glumes firm, acute, obscurely nerved, scabrous on the keel. 2↓ —Seacoast, Maine (Cape Elizabeth), Massachusetts (Harwich), Oregon (Linnton); introduced from Europe.

FIGURE 443.—Distribution of *Agropyron repens.*

4. Agropyron arenícola Davy. (Fig. 444.) Culms low, more or less spreading, 10 to 20 cm tall, with slender extensively creeping rhizomes; blades involute, mostly longer than the culms, pungent-pointed; spike 2 to 5 cm long, the axis glabrous; spikelets few-flowered, about 15 mm long; glumes narrowly lanceolate, nerveless, firm, narrowed to a pungent point, ciliolate; lemmas about 1 cm long, obscurely nerved, scabrous toward margin and summit. 2↓ —Sandy seacoast, middle California. The structure of the spikelet suggests that this species may belong to *Elymus* though the spikelets are solitary at the nodes of the rachis.

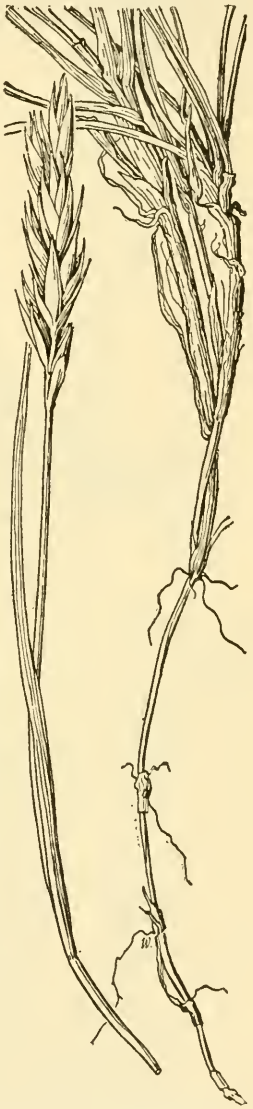

FIGURE 444.—*Agropyron arenicola*, × 1. (Davy 6781, Calif.)

5. Agropyron smíthii Rydb. BLUESTEM. (Fig. 445.) Usually glaucous; culms erect, 30 to 60 cm tall, sometimes taller, with creeping rhizomes; sheaths glabrous; blades firm, stiff, mostly flat when fresh, involute in drying, strongly nerved, scabrous or sometimes sparsely villous on the upper surface, mostly 2 to 4 mm wide, tapering to a sharp point; spike erect, mostly 7 to 15 cm long, the rachis scabrous on the angles; spikelets rather closely imbricate, occasionally two at a node, 6- to 10-flowered, 1 to 2 cm long, the rachilla scabrous or scabrous-pubescent; glumes rigid, tapering to a short awn, rather faintly nerved, 10 to 12 mm long; lemmas about 1 cm long, firm, glabrous, often pubescent near the base, obscurely nerved, acuminate, mucronate, sometimes short-awned; palea scabrous-pubescent on the keels. 2↓ —Moist, usually alkaline soil, New York; Michigan and Ohio to Alberta and Washington, south to Texas, Arizona, and northeastern California; mostly introduced east of Iowa and Kansas (fig. 446). Two varieties have been recognized. AGROPYRON SMITHII var. MÓLLE (Scribn. and Smith) Jones. Lemmas and sometimes glumes more or less pubescent. 2↓ —About the same range as the species. AGROPYRON SMITHII var. PALMÉRI (Scribn. and Smith) Heller. Lower sheaths pubescent. 2↓ —Colorado to Utah, south to New Mexico and Arizona.

6. Agropyron dasystáchyum (Hook.) Scribn. THICKSPIKE WHEATGRASS. (Fig. 447, *A*.) Often glaucous; culms mostly 40 to 80 cm tall, with creeping rhizomes; blades flat to involute, 1 to 3 mm wide; spike mostly 6 to 12 cm long; spikelets loosely to closely imbricate, 4- to 8-flowered, 1 to 1.5 cm long, the rachilla pubescent on the convex side; glumes acute or awn-pointed, scabrous or pubescent (usually

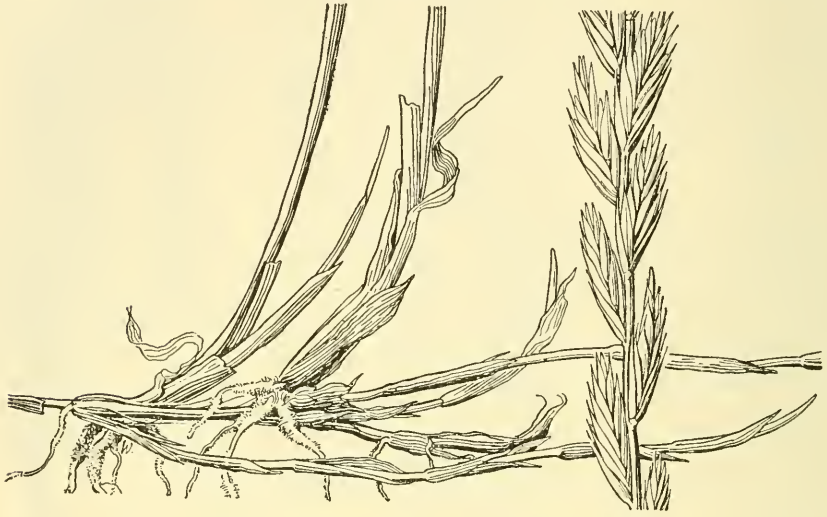

FIGURE 445.—*Agropyron smithii*, × 1. (Nelson 3918, Wyo.)

less pubescent than the lemma), 6 to 9 mm long; lemmas densely to sparsely pubescent, sometimes nearly glabrous, awnless or mucronate, about 1 cm long; palea about as long as the lemma, obtuse. 2l — Plains and sandy shores, Michigan to British Columbia, south to Illinois, Nebraska, Colorado, northern Arizona, Nevada, and Oregon (fig. 448). In the form growing on the sandy shores of Lake Michigan the lemmas are densely villous, but villous forms occur in other parts of the range of the species.

FIGURE 446.—Distribution of *Agropyron smithii*.

This and the four following species appear to intergrade, forming a polymorphous group.

7. Agropyron elmĕri Scribn. (Fig. 447, *B*.) Resembling *A. dasystachyum;* culms on the average taller, more robust, the spike longer (as much as 25 cm long), the spikelets larger (as much as 10-flowered and 2.5 cm long); glumes and lemmas usually longer (as much as 13 mm and 15 mm, respectively); lemmas pubescent, sometimes sparsely so or scabrous only or pubescent only on the margins at base. 2l —Dry or sandy soil, British Columbia to Orgeon.

8. Agropyron ripárium Scribn. and Smith. STREAMBANK WHEATGRASS. (Fig. 449.) Resembling *A. dasystachyum*, with vigorous rhizomes; blades usually narrower; spikelets usually more imbricate; lemmas glabrous or somewhat pubescent along the edges of the lower part of the lemma. 2l —Dry or moist meadows and hills, North Dakota to Alberta and Washington, south to Oregon, Arizona, and Colorado (fig. 450).

9. Agropyron álbicans Scribn. and Smith. (Fig. 451.) Similar to *A. dasystachyum;* glumes awn-pointed, about 1 cm long; awn

FIGURE 447.—*A, Agropyron dasystachyum,* × 1. (Griffiths 488, Wash.) *B, A. elmeri,* × 1. (Type.)

of lemma 1 to 1.5 cm long, divergent when dry. 2|. —Plains and dry hills, South Dakota to Alberta, and Colorado (fig. 452).

FIGURE 448.—Distribution of *A. dasystachyum.*

10. Agropyron griffíthsii Scribn. and Smith. (Fig. 453.) Resembling *A. albicans,* differing chiefly in having glabrous lemmas. 2|. —Open dry, sandy or alkaline soil, western North and South Dakota, Wyoming, and Colorado. In

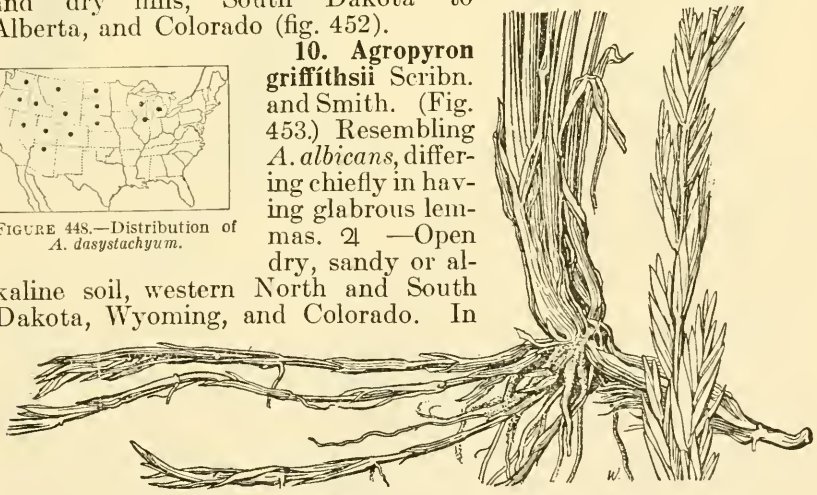

FIGURE 449.—*Agropyron riparium,* × 1. (Nelson 3965, Wyo.)

the type specimen the lemmas are smooth but in several other specimens the lemmas are scabrous. Possibly only a glabrous form of *A. albicans.*

Agropyron intermédium (Host) Beauv. Blades short, involute, acutish; glumes about 5-nerved; lemmas awnless. 2↓ —Ballast at Camden, N.J.; adventive from Europe.

Agropyron trichóphorum (Link) Richt. Blades flat; spikelets pubescent, awnless; glumes several-nerved, acutish. 2↓ —Lynn, Mass.; adventive from Europe.

Agropyron júnceum (L.) Beauv. Blades loosely involute; spikelets glabrous; glumes 9-nerved, acutish. 2↓ —Ballast near Portland, Oreg.; adventive from Europe.

11. Agropyron vulpínum (Rydb.) Hitchc. (Fig. 454.) Culms 50 to 75 cm tall, somewhat geniculate at base; blades drying loosely involute, 10 to 12 cm long, 2 to 4 mm wide; spike nodding, 10 to 15 cm long, the rachis stiffly scabrous-ciliate on the angles; spikelets imbricate but not appressed, some toward the base two at a node, 3- to 5-flowered, the rachilla appressed-pubescent; glumes scabrous, strongly 5-nerved, awn-tipped; lemmas 5-nerved toward the minutely toothed apex, coarsely pubescent, the scabrous awn 8 to 10 mm long. 2↓ (*Elymus vulpinus* Rydb.)—Known only from wet meadows, Grant County, Nebr.

FIGURE 450.—Distribution of *Agropyron riparium.*

FIGURE 452.—Distribution of *Agropyron albicans.*

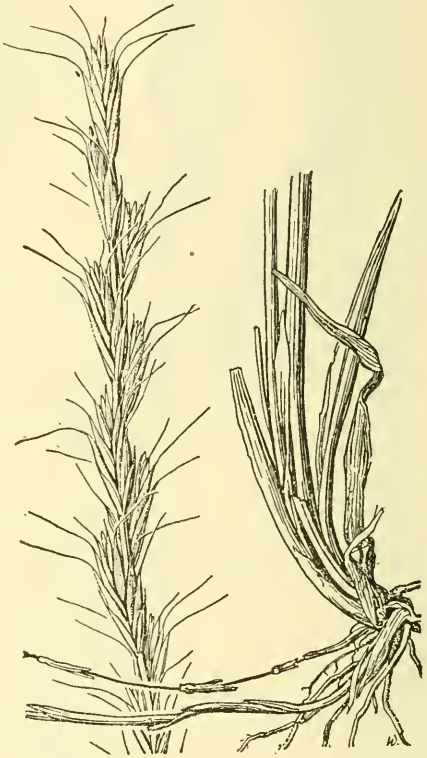

FIGURE 451.—*Agropyron albicans*, × 1. (Griffiths 3013, Wyo.)

12. Agropyron subsecúndum (Link) Hitchc. BEARDED WHEATGRASS. (Fig. 455.) Green or glaucous, without creeping rhizomes; culms erect, tufted, 50 to 100 cm tall; sheaths glabrous or rarely pubescent; blades flat, 3 to 8 mm wide; spike erect or slightly nodding, 6 to 15 cm long, sometimes unilateral from twisting of the spikelets to one side, the rachis scabrous or scabrous-ciliate on the angles, sometimes, disarticulating; spikelets rather closely imbricate, few-flowered the rachilla villous, the callus of the florets short-pilose; glumes broad rather prominently 4- to 7-nerved, nearly as long as the spikelet,

tapering into an awn; lemmas obscurely 5-nerved, the nerves becoming prominent toward the tip, the awn straight or nearly so, usually 1 to 3 cm long. 2l —Moist meadows and open woods, Newfoundland to Alaska, south to the mountains of Maryland, to Indiana, Nebraska, New Mexico, Arizona, and California (fig. 456). Said by Malte to be self-pollinated. This is the species which has generally been called by American botanists *A. caninum* (L.) Beauv., which is a European species, differing in having 3-nerved glumes.

FIGURE 454.—*Agropyron vulpinum*, × 1. (Type.)

AGROPYRON SUBSECUNDUM var. ANDÍNUM (Scribn. and Smith) Hitchc. Culms mostly not more than 50 cm tall, loosely tufted, usually geniculate at base; lower sheaths pale, usually papery; spike short; awns mostly 5 to 10 mm long, often curved. An alpine form of mountain meadows. 2l —Montana to Washington, south to Colorado and Nevada.

Agropyron canínum (L.) Beauv. Glumes 3-nerved. 2l —Ballast near Portland, Oreg.; adventive from Europe.

FIGURE 455.—*Agropyron subsecundum*, × 1. (Shear 452, Mont.)

13. Agropyron pauciflórum (Schwein.) Hitchc. SLENDER WHEATGRASS. (Fig. 457.) Resembling *A. subsecundum;* sheaths glabrous or rarely pubescent; blades mostly 2 to 4 mm wide; spike usually more slender, 10 to 25 cm long, sometimes unilateral; spikelets from rather remote to closely imbricate; glumes and lemmas awnless or nearly so. 2l (*A. tenerum* Vasey.)—Labrador to Alaska, south to the mountains of West Virginia, Missouri, New Mexico, and California; northwestern Mexico (fig. 458). Alpine plants lower, with shorter denser commonly purplish spikes, resemble *A. subsecundum* var. *andinum* but are awnless. They have been referred to *A. violaceum* (Hornem.) Lange, an arctic species, and to *A. biflorum* (Brignoli) Roem. and Schult.

FIGURE 453.—*Agropyron griffithsii*, × 1. (Williams and Griffiths 164, Wyo.)

Agropyron pseudorépens Scribn. and Smith. Appears to be distinct, differing in the slender creeping rhizomes and villous rachilla joints. *A. pseudorepens* var. *magnum* Scribn. and Smith may be a large form. 2l —Open ground, thickets, and open woods, South Dakota to Washington, south to New Mexico, and northern Arizona; Michigan (Grand Island).

FIGURE 456.—Distribution of *Agropyron subsecundum.*

14. Agropyron latiglúme (Scribn. and Smith) Rydb. (Fig. 459.) Culms loosely tufted, curved or geniculate below, 20 to 50 cm tall;

blades flat, short, 3 to 5 mm wide, pubescent on both surfaces; spike mostly 3 to 6 cm long, sometimes longer; spikelets usually closely imbricate; glumes rather broad and flat; lemmas pubescent, awnless or nearly so. 2l —Alpine regions, Montana to Labrador and Alaska.

15. Agropyron bakéri E. Nels. BAKER WHEATGRASS. (Fig. 460.) Resembling *A. subsecundum;* culms erect. mostly 50 to 100 cm tall,

FIGURE 457.—*Agropyron pauciflorum,* × 1. (Shear 404.)

FIGURE 458.—Distribution of *Agropyron pauciflorum.*

FIGURE 459.—*Agropyron latiglume,* × 3. (Type.)

FIGURE 460.—*Agropyron bakeri,* × 1. (Hitchcock 1686, Colo.)

rather loosely tufted; spike mostly 5 to 12 cm long, the spikelets rather loosely imbricate; awns divergently curved when dry, 1 to 4 cm long. 2l —Open slopes, upper altitudes, northern Michigan; Alberta to Washington and New Mexico (fig. 461).

16. Agropyron pringlei (Scribn. and Smith) Hitchc. (Fig. 462.) Culms tufted, decumbent at base, 30 to 50 cm tall, the basal sheaths

soft and papery; blades flat or loosely involute, mostly less than 10 cm long, 1 to 3 mm wide; spike more or less flexuous, 4 to 7 cm long, the rachis scabrous on the angles, slender, the middle internodes usually 8 to 10 mm long; spikelets mostly 3 to 7 in each spike, rather distant, the lower and middle ones (excluding awns) about as long as two internodes, mostly 3- to 5-flowered, the rachilla joints minutely scabrous, about 2 mm long; glumes rather narrow, about 3-nerved on the exposed side, 7 to 8 mm long, tapering into a straight awn about 5 mm long; lemmas tapering into a scabrous, strongly divergent awn 1.5 to 2.5 cm long; palea 10 to 12 mm long. 2‡ —Stony slopes, 2,500 to 3,500 m, Sierra Nevada, Tulare County, to Sierra County, Calif.

FIGURE 461.—Distribution of *Agropyron bakeri*.

17. Agropyron scribnéri Vasey. SPREADING WHEATGRASS. (Fig. 463.) Culms tufted, prostrate or decumbent-spreading, often flexuous,

FIGURE 462.—*Agropyron pringlei*, × 1 (Pringle 504, Calif.)

FIGURE 463.—*Agropyron scribneri*, × 1. (Shear 1179, Colo.)

20 to 40 cm long; blades flat or, especially on the innovations, loosely involute, more or less pubescent, mostly basal, the 2 or 3 culm blades usually less than 5 cm long, 1 to 3 mm wide; spike long-exserted, often nodding or flexuous, dense, 3 to 7 cm long, the rachis disarticulating at maturity, the internodes glabrous, 3 to 5 mm long, or the lowermost

longer; spikelets 3- to 5-flowered, the rachilla internodes minutely scabrous, about 2 mm long; glumes narrow, one obscurely nerved, the other with 2 or 3 distinct nerves, tapering into a divergent awn similar to the awns of the lemmas; lemmas nerved toward the tip, tapering to a strongly divergent awn 1.5 to 2.5 cm long; palea a little longer than the body of the lemma, the apex with 2 short slender teeth. 2l —Alpine slopes, 3,000 to 4,000 m, Montana to northern New Mexico, Nevada, and northern Arizona (fig. 464). Characterized by the hard leafy basal tussock with slender spreading flexuous culms.

18. Agropyron spicâtum (Pursh) Scribn. and Smith. BLUEBUNCH WHEATGRASS. (Fig. 465.) Green or glaucous; culms tufted, often in large bunches, erect, 60 to 100 cm tall; sheaths

FIGURE 464.—Distribution of *Agropyron scribneri.*

glabrous; blades flat to loosely involute, 1 to 2 mm, sometimes to 4 mm wide, glabrous beneath, pubescent on the upper surface; spike slender,

FIGURE 466.—Distribution of *Agropyron spicatum.*

mostly 8 to 15 cm long, the rachis scaberulous on the angles, 1 to 2 cm long, or the lowermost 2.5 cm; spikelets distant, not as long (excluding the awns) as the internodes or slightly longer, mostly 6- to 8-flowered, the rachilla joints scaberulous, 1.5 to 2 mm long; glumes rather narrow, obtuse to acute, rarely short-awned, about 4-nerved, usually about half as long as the spikelet, glabrous or scabrous on the nerves; lemmas about 1 cm long, the awn strongly divergent, 1 to 2 cm long; palea about as long as the lemma, obtuse. 2l —Plains, dry slopes, canyons and dry open woods, northern Michigan to Alaska, south to western South Dakota, New Mexico, and California (fig. 466). A smaller form with smaller spikelets, found in desert regions of the Great Basin has been differentiated as *A. vaseyi* Scribn. and Smith.

A. SPICATUM var. PUBÉSCENS Elmer. Culms and foliage pubescent. 2l —Washington and Idaho.

FIGURE 465.—*Agropyron spicatum,* × 1. (Vasey, Wash.)

19. Agropyron inérme (Scribn. and Smith) Rydb. BEARDLESS WHEATGRASS. (Fig. 467.) Differing from *A. spicatum* in the awnless spikelets. 2l (*A. spicatum* var. *inerme* Heller.)—Dry plains and hills, Montana to British Columbia, south to Utah, Wyoming,

FIGURE 467.—*Agropyron inerme*, × 1. (Horner 571, Wash.)

FIGURE 469.—*Agropyron arizonicum*, × 1. (Type.)

FIGURE 468.—Distribution of *Agropyron inerme*.

FIGURE 470.—Distribution of *Agropyron arizonicum*.

western Nebraska, and eastern Oregon (fig. 468). Closely related to *A. spicatum* but very different in appearance because awnless.

20. Agropyron arizónicum Scribn. and Smith. (Fig. 469.) Resembling *A. spicatum*, usually taller and coarser; blades commonly 4 to 6 mm wide; spike 15 to 30 cm long, flexuous, the rachis more slender; spikelets distant, mostly 3- to 5-flowered; glumes short-awned; awns of the lemmas stouter, mostly 2 to 3 cm long. 2l —Rocky slopes, western Texas, New Mexico, Arizona, Nevada, California (Eel Ridge), and Chihuahua (fig. 470).

Agropyron semicostátum (Steud.) Nees. Blades flat; spike nodding, 10 to 20 cm long; spikelets several-flowered, imbricate; glumes several-nerved, much shorter than the spikelet, acute but scarcely awned; awn of lemma flexuous or finally divergent, 1.5 to 3 cm long. 2l — Ballast near Portland, Oreg. Native of Asia.

FIGURE 471.—*Agropyron parishii*. × 1. (Type.)

21. Agropyron paríshii Scribn. and Smith. (Fig. 471.) Culms 70 to 100 cm tall, the nodes retrorsely pubescent; blades flat or loosely involute, 2 to 4 mm wide; spike slender, nodding, 10 to 25 cm long, the internodes of the rachis 1.5 to 2.5 cm long; spikelets 4- to 7-flowered, mostly about 2 cm long, narrow, appressed, the rachilla joints scaberulous, about 2 mm long; glumes 3- to 5-nerved, 1 to 1.5 cm long, acute; lemmas acute or with a slender awn 1 to 8 mm long; palea as long as the lemma, obtuse. 2l —Canyons and rocky slopes, California (Monterey and San Bernardino Mountains); rare. AGRO-

PYRON PARISHII var. LAÉVE Scribn. and Smith. Nodes glabrous; awns usually 1 to 2 cm long. 2↓ —California (Trinity County to San Diego County).

22. Agropyron saxícola (Scribn. and Smith) Piper. (Fig. 472.) Culms tufted, erect, 30 to 80 cm tall; sheaths glabrous or sometimes pubescent; blades flat to loosely involute, glabrous or sometimes pubescent, 1 to 4 mm wide; spike 5 to 12 cm long, the rachis tardily disarticulating, the internodes more or less scabrous on the angles, 5 to 10 mm long; spikelets imbricate, sometimes in pairs, about twice as long as the internodes of the rachis, 4- to 6-flowered, the rachilla minutely scabrous; glumes narrow, 2-nerved, the nerves sometimes obscure, sometimes with a third faint nerve, awned, the awn divergent, 5 to 20 mm long, sometimes with a tooth or short awn at the base of the main awn; lemmas about 8 mm long, the awn divergent, mostly 2 to 5 cm long, sometimes with 1 or 2 short additional awns; palea about as long as the lemma, obtuse or truncate. 2↓ —Dry or rocky slopes and plains, western South Dakota to Washington, south to Utah, Arizona, and California (fig. 473). This species is a transitionto *Sitanion*.

FIGURE 472.—*Agropyron saxicola*, ×1. (Type.)

23. Agropyron saundérsii (Vasey) Hitchc. (Fig. 474.) Culms erect, 60 to 100 cm tall; blades flat or loosely involute; spike erect, 8 to 15 cm long, mostly purplish, the rachis tardily disarticulating; spikelets sometimes in pairs near the middle of the spike, 1 to 1.5 cm long (excluding awns), 2- to 5-flowered; glumes variable, narrow with 2 nerves or wider with 3 to 5 nerves, the nerves strong and at least the midnerve scabrous, the awn 2 to 4 cm long, sometimes with a short lateral awn near the base; lemmas scabrous, the awn straight, 2 to 5 cm long. 2↓ (*Elymus saundersii* Vasey.)—Dry slopes, Colorado (Veta Pass) and Utah (Salt Lake City).

FIGURE 473.—Distribution of *Agropyron saxicola*.

FIGURE 474.—*Agropyron saundersii*, ×1. (Type.)

40. TRÍTICUM L.

Spikelets 2- to 5-flowered, solitary, placed flatwise at each joint of a continuous or articulate rachis, the rachilla disarticulating above the glumes and between the florets or continuous; glumes rigid, keeled, 3- to several-nerved, the apex abruptly mucronate or toothed or with one to several awns; lemmas broad, keeled, very asymmetric, many-nerved, abruptly pointed or awned. Low or rather tall annuals, with flat blades and thick spikes. Standard species, *Triticum aestivum*. *Triticum*, the old Latin name for wheat.

1. Triticum aestívum L. Wheat. (Fig. 475.) Culms erect, freely branching at base, 60 to 100 cm tall; blades 1 to 2 cm wide; spike mostly 5 to 12 cm long; internodes of rachis 3 to 6 mm long; spikelets broad, glabrous or pubescent, long-awned to awnless; glumes usually strongly keeled toward one side, the keel extending into a mucro, the other side usually obtusely angled at apex. ⊙ (*T. vulgare* Vill.; *T. sativum* Lam.)—Commonly cultivated; fields and waste places in the vicinity of cultivated fields or grain elevators, but scarcely established.

Spelt (*T. spelta* L.) and emmer (*T. dicoccum* Schrank) are sometimes cultivated for the grain, used for stockfeed, and for forage. In these two species the rachis breaks up, each joint bearing a spikelet which remains entire, each floret permanently enclosing the grain. In spelt the spikelets are somewhat distant, exposing the rachis, in emmer the spikelets are closely imbricate, scarcely exposing the rachis. A large number of varieties of wheat are in cultivation; the lemmas may be glabrous or pubescent, the awns long or nearly or quite wanting.

On the basis of the number of chromosomes the wheats and their allies may be divided into three groups. The group with 7 chromosomes (probably the most primitive) includes einkorn (*T. monococcum* L.). The group with 14 chromosomes includes durum wheat (*T. durum* Desf.), poulard wheat (*T. turgidum* L.), Polish wheat (*T. polonicum* L.), and emmer (*T. dicoccum* Schrank). The group with 21 chromosomes includes spelt and the varieties of wheat commonly cultivated in the United States, one series of which, with short compact heads, is club wheat (*T. compactum* Host). Alaska wheat is a variety of poulard wheat with branched heads. It is also known by several other names, such as Egyptian, miracle, and mummy. This variety is considered inferior commercially to standard varieties of wheat. Stories of varieties originating from seed found with mummies 3,000 years old have no basis in fact.

The origin of wheat is not known as there is no native species like any of the cultivated forms. Some botanists have suggested species of *Aegilops*, and others *T. dicoccoides* Koern., a wild species of Palestine, as the possible ancestor.

41. AÉGILOPS L. Goatgrass

Spikelets 2- to 5-flowered, solitary, turgid or cylindric, placed flatwise at each joint of the rachis and fitting into it, the joints thickened at the summit, the spikelets usually not reaching the one above on the same side, exposing the rachis; spike usually disarticulating near the base at maturity, falling entire, or finally disarticulating between the spikelets. Annuals with flat blades and usually awned spikes. Type species, *Aegilops ovata*. Name from *Aegilops*, an old Greek name for a kind of grass.

The species of *Aegilops* have been recently introduced into the United States and give indications of becoming troublesome weeds. At maturity the spikes fall entire, the lowest rachis joint serving as a pointed callus to the 2- to several-jointed, strongly barbed fruits, which work their way into the mouths and noses of grazing animals and into the wool of sheep.

Spikelets subovate; rachis not disarticulating ..... 3. A. OVATA.
Spikelets cylindric; rachis finally disarticulating.
  Glumes with one awn ..... 1. A. CYLINDRICA.
  Glumes with three awns ..... 2. A. TRIUNCIALIS.

FIGURE 475.—*Triticum aestivum.* Plant with awned spikes (bearded wheat) and a nearly awnless spike (*A*) beardless wheat, × ½; spikelet and floret, × 3. (Cult.)

1. Aegilops cylíndrica Host. JOINTED GOATGRASS. (Fig. 476, *B.*) Culms erect, branching at base, 40 to 60 cm tall; blades 2 to 3 mm wide; spike cylindric, 5 to 8 cm long; internodes of rachis 6 to 8 mm long; spikelets 8 to 10 mm long, glabrous to hispid; glumes several-

FIGURE 476. *A, Aegilops triuncialis,* × ½. (Cole, Calif.) *B, A. cylíndrica,* × ½. (Bush 72148, Mo.)

nerved, keeled at one side, the keel extending into an awn, the main nerve of the other side extending into a short tooth; lemmas mucronate, those of the uppermost spikelets awned like the glumes; awns very scabrous, those of the upper spikelets about 5 cm long, those of the

lower spikelets progressively shorter. ⊙ —Weed in wheatfields, and waste places, Missouri, Kansas, Oklahoma, Colorado, and New Mexico; recently introduced from Europe.

2. Aegilops triunciális L. Barb goatgrass. (Fig. 476, *A*.) Culms branching and spreading at base, 20 to 40 cm tall; blades rather rigid, sharp-pointed, spreading; spike 3 to 4 cm long, 2 or 3 of the lower spikelets often reduced, the fertile spikelets 3 to 5; glumes with 3 strong scabrous, somewhat spreading awns, 4 to 8 cm long; lemmas with three rigid unequal awns. ⊙ —Troublesome weed on range land, California; introduced from Europe.

3. Aegilops ováta L. Culms tufted, geniculate at base, 15 to 25 cm tall; blades short, sharp-pointed; spike thick, of 2 to 4 subovate spikelets, the upper sterile; glumes with 4 stiff scabrous spreading awns 2 to 3 cm long; lemmas usually with 1 long and 2 short awns. ⊙ — Weed in fields, California and Virginia; introduced from Europe.

42. SECÁLE L. Rye

Spikelets usually 2-flowered, solitary, placed flatwise against the rachis, the rachilla disarticulating above the glumes and produced beyond the upper floret as a minute stipe; glumes narrow, rigid, acuminate or subulate-pointed; lemmas broader, sharply keeled, 5-nerved, ciliate on the keel and exposed margins, tapering into a long awn. Erect, mostly annual grasses, with flat blades and dense spikes. Type species, *Secale cereale*. *Secale*, the old Latin name for rye.

1. Secale cereâle L. Rye. (Fig. 477.) In habit resembling wheat but usually taller, the spike more slender, somewhat nodding, on the average longer. ⊙ —Commonly cultivated; escaped from cultivation, in fields and waste places. This species is thought to be derived from *S. montanum* Guss., a perennial native in the mountains of southwestern Asia.

43. ÉLYMUS L. Wild-rye

Spikelets 2- to 6-flowered, in pairs (rarely 3 or more or solitary) at each node of a usually continuous rachis, placed as in *Agropyron* but the rachilla distorted at base, bringing the florets more or less dorsiventral to the rachis; rachilla disarticulating above the glumes and between the florets; glumes equal, somewhat asymmetric, usually rigid, sometimes indurate below, narrow to subulate, 1- to several-nerved, acute to aristate; lemmas rounded on the back or nearly terete, obscurely 5-nerved, acute or usually awned from the tip. Erect, usually rather tall perennials (one annual), with flat or rarely convolute blades and slender or bristly spikes, the spikelets usually crowded, sometimes somewhat distant. Type species, *Elymus sibiricus* L. Name from *Elumos*, an old Greek name for a kind of grain. The species in which the spikelets are mostly solitary can be distinguished from *Agropyron* by the narrow or subulate glumes. The seed of certain species (e.g., *E. mollis* and *E. canadensis*) have been used for food by the Indians.

The species of *Elymus* are for the most part good forage grasses, and in some localities form a part of the native hay. In the wooded areas of the Northwest, *E. glaucus* is one of the valuable secondary grasses of the ranges. The species with creeping rhizomes are likely

FIGURE 477.—*Secale cereale.* Plant, × ½; spikelet, × 3; floret, × 5. (Hill, Ill.)

to be of value as soil or sand binders. *E. mollis* is a natural sea dune grass and *E. arenicola* and *E. flavescens* are common on inland shifting dunes; *E. triticoides* is to be recommended for holding embankments. On the western ranges *E. condensatus* and *E. triticoides* are important.

1a. Plants annual; spike long-awned, nearly as broad as long.
1. E. CAPUT-MEDUSAE.
1b. Plants perennial; spike much longer than broad.
2a. Rhizomes present, slender, creeping.
Glumes lanceolate, awnless or awn-pointed. Plants of coastal dunes.
Glumes and lemmas papery, distinctly nerved 2. E. MOLLIS.
Glumes and lemmas firm, faintly nerved (lemmas nerved at apex).
3. E. VANCOUVERENSIS.
Glumes subulate or very narrow.
Spikelets glabrous; lemmas short-awned 8. E. TRITICOIDES.
Spikelets densely villous to coarsely, sometimes sparsely, pubescent.
Lemmas awned or awn-tipped; spike 5 to 15 cm long.
Lemmas copiously villous; awn 1 to 4 mm long 6. E. INNOVATUS.
Lemmas hirsute or hirtellous; awn 5 to 10 mm long.
7. E. HIRTIFLORUS.
Lemmas awnless; spike 10 to 25 cm long.
Glumes pubescent; lemmas soft, densely villous 4. E. FLAVESCENS.
Glumes glabrous or nearly so; lemmas relatively firm, coarsely pubescent, sometimes sparsely so 5. E. ARENICOLA.
2b. Rhizomes wanting (or short and stout in *E. condensatus*). Plants tufted.
3a. Rachis tardily disjointing. Glumes and lemmas awned.
Spike mostly 5 to 7 mm wide; spikelets mostly in twos; blades subinvolute.
15. E. MACOUNII.
Spike 8 to 10 mm wide; spikelets often in threes; blades flat, 5 to 10 mm wide.
16. E. ARISTATUS.
3b. Rachis continuous.
4a. Glumes subulate to subsetaceous, not broadened above the base, the nerves obscure except in *E. villosus*.
Lemmas awnless or awn-tipped, the awn shorter than the body.
Spike thick, sometimes compound; spikelets commonly in twos to fours.
11. E. CONDENSATUS.
Spike slender; some or most of the spikelets solitary at the nodes, the paired spikelets near the middle.
Culms numerous in a close tuft, the leaves mostly basal; lemmas mostly awnless 10. E. SALINA.
Culms few, loosely tufted, the leaves scattered along the usually taller culms; lemmas awn-tipped, the awn 2 to 5 mm long.
9. E. AMBIGUUS.
Lemmas awned, the awn as long as the body or longer.
Awns straight; lemmas about 1.2 mm wide across the back.
17. E. VILLOSUS.
Awns flexuous-divergent; lemmas about 2 mm wide across the back.
18. E. INTERRUPTUS.
4b. Glumes lanceolate or narrower, broadened above the base, strongly 3- to several-nerved.
Glumes relatively thin, flat, several-nerved, not indurate at base.
Lemmas sparsely long-hirsute on the margins toward the summit.
14. E. HIRSUTUS.
Lemmas glabrous or scabrous.
Lemmas awned 12. E. GLAUCUS.
Lemmas awnless or minutely awn-tipped 13. E. VIRESCENS.
Glumes firm, indurate at base.
Awns divergently curved when dry; base of glumes not terete.
19. E. CANADENSIS.
Awns straight; base of glumes terete.
Glumes about 1 mm wide about the middle, the bases not bowed out.
20. E. RIPARIUS.
Glumes 1.5 to 2 mm wide about the middle, the bases bowed out.
21. E. VIRGINICUS

1. Elymus cáput-medúsae L. (Fig. 478.) Annual; culms ascending from a decumbent, branching base, slender, 20 to 60 cm tall; blades

narrow, short; spike very bristly, 2 to 5 cm long (excluding the long spreading awns); glumes subulate, smooth, indurate below, tapering into a slender awn 1 to 2.5 cm long; lemmas lanceolate, 3-nerved, 6 mm long, very scabrous, tapering into a flat awn 5 to 10 cm long. ⊙ —Open ground, Washington to California, infrequent; introduced from Europe.

2. Elymus móllis Trin. American dunegrass. (Fig. 479.) Culms stout, pubescent below the spike, glaucous, 60 to 120 cm tall, with numerous overlapping basal leaves, the rhizomes widely creeping; blades firm, 7 to 12 mm wide, often involute in drying; spike erect,

Figure 478.—*Elymus caput-medusae*, × 1. (Vasey 3076, Wash.)

dense, thick, soft, pale, 7 to 25 cm long; glumes lanceolate, flat, many-nerved, scabrous or pubescent, 12 to 25 mm long, acuminate, about as long as the spikelet; lemmas scabrous to felty-pubescent, acuminate or mucronate. 2l —Sand dunes along the coast, Alaska to Greenland, south to Massachusetts and central California; along Lakes Superior and Michigan (fig. 480); also eastern Siberia to Japan. Closely related to the European *E. arenarius* L. with culm smooth below the spike and glabrous glumes. A form found along the coast of Washington with somewhat compound spikes has been differentiated as *E. arenarius* var. *compositus* (Abrom.) St. John.

3. Elymus vancouverénsis Vasey. (Fig. 481.) Resembling *E. mollis*, less leafy; spike somewhat interrupted, purplish; glumes narrowly lanceolate, firm, gradually acuminate, 1 to 1.5 cm long, sparsely long-villous, especially toward the apex; lemmas firm, 1 to 1.5 cm long, tapering into a short awn. 2l —Dunes and sandy shores, British Columbia to northern California.

4. Elymus flavéscens Scribn. and Smith. (Fig. 482.) Culms erect, slender, glabrous, 50 to 100 cm tall, the rhizomes slender, nearly vertical from deep slender horizontal rhizomes with brown scales; sheaths glabrous; blades firm, glabrous beneath, scabrous on the upper surface, 2 to 5 mm wide, flat, or involute in drying; spike 10 to 25 cm long, sometimes with short branches, somewhat nodding; spikelets 2 to 3 cm long, several-flowered, approximate or somewhat distant; glumes very narrow or subulate, pubescent, nerveless, 1 to 1.5 cm long; lemmas awnless, densely silky-villous, the hairs long, yellowish or brownish. 2l — Sand dunes, eastern Washington and Oregon, Idaho; South Dakota (Black Hills) (fig. 483).

FIGURE 480.—Distribution of *Elymus mollis*.

FIGURE 479.—*Elymus mollis*, × 1. (Henderson 2169, Wash.)

5. Elymus arenícola Scribn. and Smith. (Fig. 484.) Resembling *E. flavescens* to which it is closely related; glumes glabrous or nearly so; lemmas firmer, coarsely pubescent, sometimes sparsely so, or the pubescence confined to the base or margins, the pubescence grayish rather than yellow. 2l —Sandy valleys, often in drifting sand, Washington, Oregon, and Idaho.

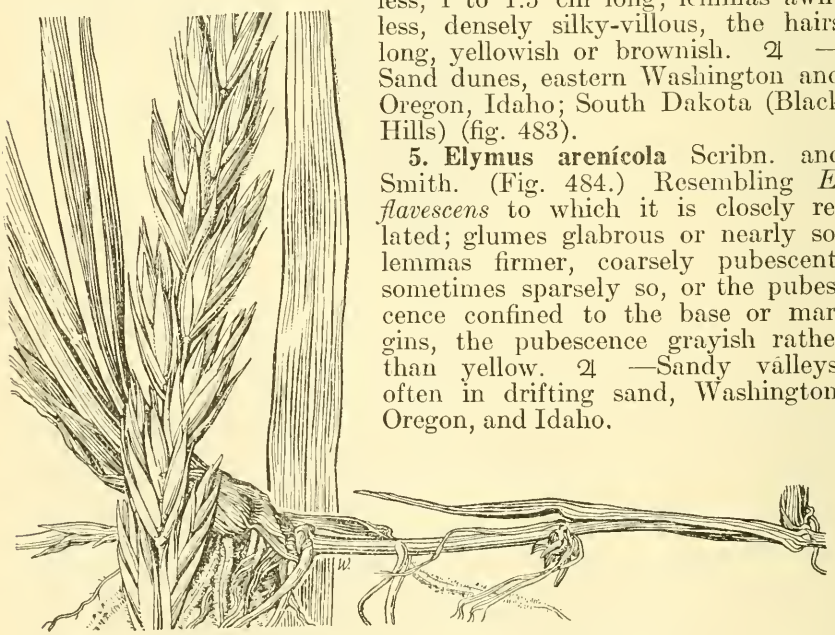

FIGURE 481.—*Elymus vancouverensis*, × 1. (Piper 812, Wash.)

6. Elymus innovátus Beal. (Fig. 485.) Resembling *E. flavescens;* spike rather dense, 5 to 12 cm long, the axis villous; spikelets 1 to 1.5 cm long, the narrow glumes and the lemmas densely purplish or grayish-villous, the lemmas with an awn mostly 1 to 4 mm long. 2l —Open woods and gravelly flats, Alaska to British Columbia; Montana, Wyoming, and South Dakota (Black Hills).

FIGURE 482.—*Elymus flavescens*, × 1. (Merrill and Wilcox 160, Idaho.)

7. Elymus hirtiflórus Hitchc. (Fig. 486.) Culms erect, tufted, 40 to 90 cm tall, with slender creeping rhizomes; blades firm, flat or usually involute, glabrous beneath, 5 to 20 cm long, 1 to 4 mm wide when flat; spike erect, 5 to 15 cm long; spikelets 4- to 6-flowered; glumes firm, hirsute, narrow, tapering into an awn about as long as the body, the entire length 1 to 1.5 cm; lemmas hirsute, sometimes sparingly so, the lower 8 to 9 mm long, with an awn 5 to 10 mm long. 2l —River banks, Wyoming.

FIGURE 483.—Distribution of *Elymus flavescens*.

8. Elymus triticoídes Buckl. BEARDLESS WILD-RYE. (Fig. 487.) Culms usually glaucous, rarely pubescent below spike, 60 to 120 cm tall, commonly in large colonies from extensively creeping scaly rhizomes; ligule a truncate rim about 1 mm long; blades mostly 2 to 6 mm wide, flat or soon involute; spike erect, slender to rather dense, rarely compound; spikelets mostly 12 to 20 mm long; glumes very narrow to subulate, firm, nerveless or 1- to 3-nerved, awn-tipped, 5 to 15 mm long, those of the upper spikelets usually reduced or obsolete; lemmas 6 to 10 mm long, glabrous, firm, brownish, purplish or tawny, awn-tipped. 2l —Moist or alkaline soil, at low and medium elevations, Montana to Washington, south to western Texas and Baja California (fig. 488). ELYMUS TRITICOIDES VAR. PUBÉSCENS Hitchc. Sheaths and involute blades pubescent. 2l —Oregon,

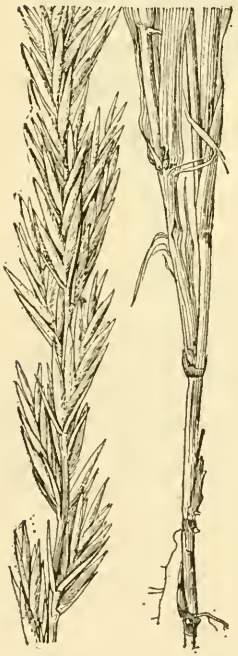

FIGURE 484.—*Elymus arenicola*, × 1. (Palmer 356, Idaho.)

FIGURE 485.—*Elymus innovatus*, × 1. (Hayward 2719, S. Dak.)

California, Idaho, Nevada; rare. ELYMUS TRITICOIDES var. SÍMPLEX (Scribn. and Will.) Hitchc. Usually less than 60 cm tall; blades rather short, involute; spike usually less than 10 cm long; spikelets mostly solitary; glumes often rather broad at base. 2↓ (*E. simplex* Scribn. and Will.)—Wyoming and Colorado to California (Tahoe) and eastern Oregon (Harney County).

9. Elymus ambíguus Vasey and Scribn. (Fig. 489.) Culms few, loosely tufted, erect, 30 to 70 cm tall; sheaths glabrous; blades flat to subinvolute, 2 to 5 mm wide, scabrous; spike erect, rather dense, 5 to 15 cm long; spikelets solitary toward the base and apex of the spike, mostly 2- to 4-flowered; glumes subulate, scabrous toward the awned tip; lemmas glabrous or scabrous on the back, about 1 cm long, short-awned, the awn 2 to 5 mm long. 2↓ —Open slopes at medium altitudes in the mountains, Colorado, rare in Montana and Utah. ELYMUS AMBIGUUS var. STRIGÓSUS (Rydb.) Hitchc. Lemmas strigose or pubescent. 2↓ (*E. strigosus* Rydb., lemmas strigose; *E. villiflorus* Rydb., lemmas pubescent.)—Wyoming, Colorado.

10. Elymus salína Jones. SALINA WILD-RYE. (Fig. 490.) Culms erect, 30 to 80 cm tall, sometimes scabrous below nodes and below spike; sheaths scabrous; blades firm, involute, scabrous, or rarely softly pubescent; spike slender, erect, 5 to 12 cm long; spikelets mostly solitary, often rather distant, 1 to 1.5 cm long; glumes subulate, 4 to 8 mm long, sometimes reduced, glabrous or scabrous; lemmas about 1 cm long, awnless or rarely awn-tipped, glabrous or scabrous, rarely sparsely strigose, the nerves obscure. 2↓ —Rocky slopes and sagebrush hills, Wyoming, Idaho, Utah, and Arizona.

FIGURE 486.—*Elymus hirtiflorus*, Spike × 1; spikelet, × 5. (Type.)

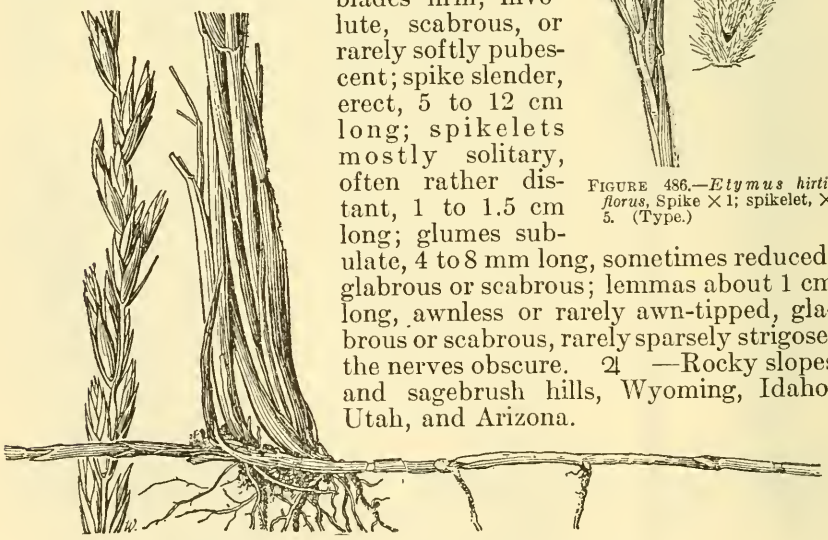

FIGURE 487.—*Elymus triticoides*, × 1. (Cusick 763, Oreg.)

11. Elymus condensátus Presl. GIANT WILD-RYE. (Fig. 491.) Culms in large tufts, stout, usually 1 to 3 m tall, sometimes puberulent, especially below the nodes, the rhizomes when present short and

thick; ligule 2 to 5 mm long; blades firm, strongly nerved, flat, as much as 2 cm wide; spike erect, usually dense, 15 to 30 cm long, sometimes compound; spikelets often in threes to fives; glumes subulate, awn-pointed, usually 1-nerved or nerveless, about as long as the first lemma; lemmas glabrous to sparsely strigose, awnless or mucronate. ♃ —Dry plains, slopes, sand hills, and along gullies and ditches up to medium altitudes, Minnesota to British Columbia, south to Colorado, New Mexico, and California (fig. 492). On the coast of California there is a form with robust culms as much as 3 m tall, compound spikes as much as 30 cm long and 4 cm thick, the ascending compound branches sometimes 6 cm long. This form usually has pronounced rhizomes; possibly distinct. ELYMUS CONDENSATUS var. PÚBENS Piper (*E. cinereus* Scribn. and Merr.) Sheaths and blades harsh-puberulent. ♃ —Washington, Nevada, and California. The seeds are sometimes used for food by the Indians.

FIGURE 488.—Distribution of *Elymus triticoides.*

FIGURE 489.—*Elymus ambiguus*, × 1. (Hitchcock 10990, Colo.)

FIGURE 490.—*Elymus salina*, × 1. (Rydberg 2041, Wyo.)

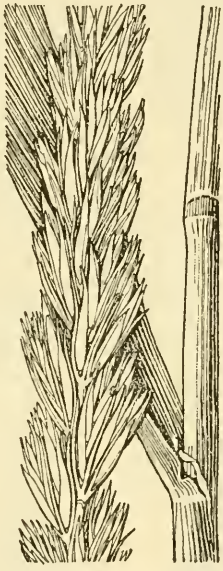

FIGURE 491.—*Elymus condensatus*, × 1. (Butler 839, Calif.)

12. Elymus glaúcus Buckl. BLUE WILD-RYE. (Fig. 493.) Culms in loose to dense tufts, often bent at base, erect, 60 to 120 cm tall, without rhizomes, leafy; sheaths smooth or scabrous; blades flat, usually lax, mostly 8 to 15 mm wide, usually scabrous on both surfaces, sometimes narrow and subinvolute; spike long-exserted, from erect to somewhat nodding, usually dense, commonly 5 to 20 cm long, occasionally longer; glumes lanceolate at base, 8 to 15 mm long, with 2 to 5 strong scabrous nerves, acuminate or awn-pointed; lemmas awned, the awn 1 to 2 times as long as the body, erect to spreading. ♃ —Open woods, copses, and dry hills at low and medium altitudes, Ontario and Michigan to southern Alaska, south through South Dakota and Colorado to New Mexico and California; Missouri

FIGURE 492.—Distribution of *Elymus condensatus.*

and Arkansas (fig. 494). Exceedingly variable, the commonest form is loosely tufted, with lax blades 10 to 15 mm wide and somewhat nodding spike, but plants with narrower blades and stiff spikes are frequent, the extreme form having been differentiated as *E. angustifolius* Davy. The original specimen described by Buckley is a rather small plant intermediate in blades and spike. ELYMUS GLAUCUS var. JEPSÓNI Davy. Sheaths and blades pubescent. 2l —British Columbia to California; Montana.

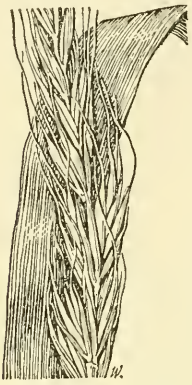

FIGURE 493.—*Elymus glaucus*, × 1. (Chase 5150, Idaho.)

FIGURE 494.—Distribution of *Elymus glaucus*.

13. Elymus viréscens Piper. (Fig. 495.) Resembling *E. glaucus* and nearly as variable in habit, often decumbent at base; sheaths from glabrous to retrorsely pubescent, blades 2 to 12 mm wide, glabrous to harsh-puberulent; spike 5 to 15 cm long, dense, spikelets imbricate; glumes flat, 1 to 2 mm wide, strongly nerved, pointed or awn-tipped; lemmas glabrous to scabrous, barely awn-tipped or with an awn 1 to 4 mm long. 2l —Moist woods, southern Alaska to California.

FIGURE 495.—*Elymus virescens*, × 1. (Flett, Wash.)

FIGURE 496.—*Elymus hirsutus*, × 5. (Thompson 7332, Wash.)

14. Elymus hirsútus Presl. (Fig. 496.) Culms solitary or in small tufts, 50 to 140 cm tall, rather weak; blades flat, lax, 4 to 10 mm wide, scabrous; spike drooping, mostly loose, the rachis exposed; spikelets mostly about 15 mm long; glumes about 1 mm wide, strongly nerved, awned; lemmas sparsely long-hirsute along the margin toward the summit, sometimes coarsely pubescent on the back, the slender awn flexuous or divergent, 1.5 to 2 cm long. 2l —Moist woods or open ground, Alaska to Oregon.

15. Elymus macoúnii Vasey. MACOUN WILD-RYE. (Fig. 497.) Culms densely tufted, erect, slender, 50 to 100 cm tall; sheaths glabrous or rarely pubescent; blades erect, rather firm, subinvolute, usually scabrous on both surfaces, 10 to 20 cm long, mostly 2 to 5 mm

wide; spike slender, erect or somewhat nodding, 4 to 12 cm long, usually about 5 mm thick (excluding awns), the slender rachis tardily disarticulating; spikelets imbricate, appressed, mostly 2-flowered, about 1 cm long, excluding the awns; glumes very narrow, scabrous, slightly divergent but not bowed out at base, the midnerve usually distinct; lemmas scabrous toward the apex, extending into slender straight awns 1 to 2 cm long. ♃ —Meadows and open ground,

FIGURE 497.—*Elymus macounii.* Disarticulating spike, × 1. (Anderson, Mont.)

FIGURE 498.—Distribution of *Elymus macounii.*

FIGURE 499.—*Elymus aristatus,* × 1. (Chase 4762, Idaho.)

FIGURE 500.—Distribution of *Elymus aristatus.*

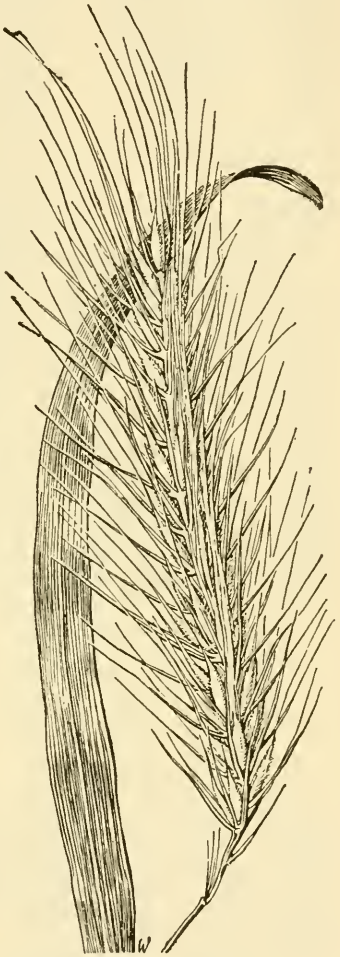

FIGURE 501.—*Elymus villosus,* × 1. (Commons 163, Del.)

Minnesota to Alaska and eastern Washington, south to Iowa, Nebraska, New Mexico, and California (fig. 498).

16. Elymus aristā**tus** Merr. (Fig. 499.) Culms tufted, rather leafy, erect, 70 to 100 cm tall; sheaths glabrous, blades flat, 5 to 10 mm wide; spike erect, dense, 6 to 14 cm long, 5 to 10 mm thick, the rachis tardily disarticulating; spikelets closely imbricate, often in threes, 1- to 2-flowered, about 1 cm long, excluding the awns; glumes subsetaceous, scabrous, 10 to 20 mm long; lemmas slightly wider than in *E. macounii*, sparsely scabrous at least on the upper half, the slender straight awn 10 to 20 mm long. ♃ —Meadows and open slopes, at middle altitudes, Idaho and Washington, south to Nevada and California (fig. 500).

17. Elymus villósus Muhl. (Fig. 501.) Culms tufted, ascending, slender, 60 to 100 cm tall; sheaths glabrous to sparsely pilose; blades flat, lax, pubescent on upper surface, glabrous or scabrous beneath; spike drooping, dense, 5 to 12 cm long; glumes subsetaceous, spreading, distinctly nerved above the firm cylindric nerveless divergent or somewhat bowed-out base, hirsute, 12 to 20 mm long; lemmas nerved toward the tip, hispidulous to hirsute, 7 to 8 mm long, about 1.2 mm across the back, the straight slender awn 1 to 3 cm long. 2↓ (*E. striatus*, American authors, not Willd. Moist or dry woods and shaded slopes, Vermont to North Dakota and Wyoming, south to North Carolina, Alabama, and Texas (fig. 502). *E. arkansanus* Scribn. and Ball is a form with glabrous or scabrous spikelets.

FIGURE 502.—Distribution of *Elymus villosus.*

18. Elymus interrúptus Buckl. (Fig. 503.) Culms erect, 70 to 130 cm tall; sheaths glabrous; blades flat scabrous, 5 to 12 mm wide; spike flexuous or nodding, 8 to 20 cm long; glumes setaceous or nearly so, 1 to 3 cm long, one or both reduced in occasional spikelets, mostly flexuous or spreading, the nerves obscure at least toward the base; lemmas hirsute to scabrous, or glabrous, about 1 cm long, about 2 mm across the back, the awn flexuous or divergent, 1 to 3 cm long.

FIGURE 504.—Distribution of *Elymus interruptus.*

2↓ (*E. diversiglumis* Scribn. and Ball.)—Rich, open moist soil, Wisconsin to North Dakota and Wyoming; Tennessee, Oklahoma, Texas, and northern Mexico (fig. 504).

FIGURE 503.—*Elymus interruptus*, × 1. (Grant 3071, Minn.)

19. Elymus canadénsis L. CANADA WILD-RYE. (Fig. 505.) Green or often glaucous; culms erect, tufted, mostly 1 to 1.5 m tall; sheaths glabrous or rarely pubescent; blades flat, scabrous or sparsely hispid on the upper surface, mostly 1 to 2 cm wide; spike thick and bristly, nodding or drooping, often interrupted below, 10 to 25 cm long, sometimes glaucous; spikelets commonly in threes or fours, slightly spreading; glumes narrow, mostly 2- to 4-nerved, scabrous, sometimes hispid but less so than the lemmas, the bases somewhat indurate and divergent but scarcely bowed out, the awn about as long as the body; lem-

FIGURE 505.—*Elymus canadensis*. Plant, × ½; spikelet and floret, × 5. (Lansing 3240, Mich.)

mas scabrous-hirsute to hirsute-pubescent, rarely glabrous, strongly nerved above, the awn divergently curved when dry, 2 to 3 cm long. 2↓ —River banks, open ground, and sandy soil, Quebec to southern Alaska, south to North Carolina, Missouri, Texas, Arizona, and northern California (fig. 506). ELYMUS CANADENSIS var. ROBÚSTUS (Scribn. and Smith) Mackenz. and Bush. Differing in the stouter and denser only slightly nodding very bristly spikes. 2↓ —Prairies, Massachusetts to Montana, south to Kentucky, Missouri, Texas, and Arizona. ELYMUS CANADENSIS var. BRACHÝSTACHYS (Scribn. and Ball) Farwell. Lemmas glabrous or nearly so. 2↓ —Moist open or partly shaded ground, Arkansas, Oklahoma, Texas, and New Mexico. Grades into *E. canadensis;* many specimens of *E. canadensis* from Kansas to North Dakota have sparingly hirsute lemmas, showing a transition to this variety.

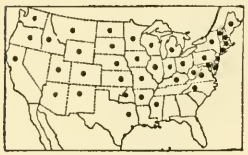

FIGURE 506.—Distribution of *Elymus canadensis.*

20. Elymus ripárius Wiegand. (Fig. 507.) Culms rather slender, erect, 1 to 1.5 m tall; sheaths glabrous; blades rather thin, flat, 5 to 15 mm wide, scabrous; spike somewhat nodding, 7 to 20 cm long; glumes narrow, about 1 mm wide at the middle, 2- to 4-nerved, somewhat indurate but scarcely bowed out at base; lemmas minutely hispidulous to glabrous, the awn straight, mostly 2 to 3 cm long. 2↓ —River banks and low ground, Quebec and Maine to Michigan, south to North Carolina, Ohio, and Indiana; Arkansas (fig. 508). Differing from *E. virginicus* var. *glabriflorus* in the nodding spike and less indurate glumes; from *E. canadensis* in the straight awns and narrower and somewhat more indurate glumes. When the ranges of *E. riparius* and *E. canadensis* coincide the latter may be distinguished by the hirsute-pubescent lemmas.

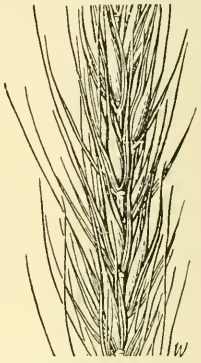

FIGURE 507.—*Elymus riparius,* × 1. (Woodward, Conn.)

FIGURE 508.—Distribution of *Elymus riparius.*

21. Elymus virgínicus L. VIRGINIA WILD-RYE. (Fig. 509.) Culms tufted, erect, 60 to 120 cm tall; sheaths glabrous; blades flat, scabrous, mostly 5 to 15 mm wide; spike usually erect, often partly included, 5 to 15 cm long; glumes strongly nerved, firm, indurate, yellowish, nerveless and bowed out at base leaving a rounded sinus, broadened above (1.5 to 2 mm wide), scabrous, the apex somewhat curved, tapering into a straight awn, about as long as the body or shorter; lemmas glabrous and nerveless below, scabrous and nerved above, tapering into a straight awn usually about 1 cm long. 2↓ —Moist ground, low woods, and along streams, Newfoundland to Alberta, south to Florida and Arizona (fig.510). Sometimes called

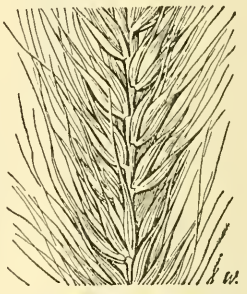

FIGURE 509.—*Elymus virginicus,* × 1. (Hitchcock 79, Va.)

Terrell grass. A variable species of which the following intergrading varieties may be distinguished.

ELYMUS VIRGINICUS var. GLABRIFLÓRUS (Vasey) Bush. Glumes mostly less bowed out; lemmas glabrous; awns mostly 2 to 3 cm long, the spike more bristly. 2↓ —Maine to Kansas, south to Florida and New Mexico.

ELYMUS VIRGINICUS var. HALÓPHILUS (Bickn.) Wiegand. More slender, usually glaucous; blades narrower, often becoming involute; spikes and spikelets somewhat smaller. 2↓ —Brackish marshes and moist sand along the coast, Maine to New Jersey.

ELYMUS VIRGINICUS var. SUBMÚTICUS Hook. Glumes and lemmas awnless or nearly so. 2↓ —Woods and open ground, Quebec to Washington, south to Rhode Island; Ohio and Kentucky to Oklahoma and Montana.

ELYMUS VIRGINICUS var. INTERMÉDIUS (Vasey) Bush. Glumes, lemmas, and rachis more or less hirsute, the awns about as in *E. virginicus*. 2↓ (*E. hirsutiglumis* Scribn.)—Thickets and low ground, Maine to Iowa, south to Florida and Texas.

ELYMUS VIRGINICUS var. AUSTRÁLIS (Scribn. and Ball) Hitchc. Differing from *E. virginicus* var. *intermedius* in the stouter, bristly spike and longer awns; differing from *E. virginicus* var. *glabriflorus* in the hirsute or strongly scabrous glumes and lemmas. 2↓ —Prairies, rocky hills, and open woods, Vermont to Iowa, south to Florida and Texas.

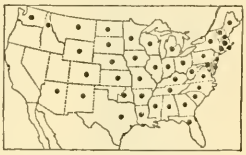

FIGURE 510.—Distribution of *Elymus virginicus*.

ELYMUS GIGANTÉUS Vahl. Robust perennial from stout rhizomes; blades numerous at base, elongate; spike dense, 15 to 20 cm long, about 2 cm thick; glumes and lemmas sharp-pointed, the glumes glabrous, the lemmas pubescent below. 2↓ —Occasionally cultivated for ornament. Siberia

44. SITÁNION Raf. SQUIRRELTAIL

Spikelets 2- to few-flowered, the uppermost floret reduced, usually 2 at each node of a disarticulating rachis, the rachis breaking at the base of each joint, remaining attached as a pointed stipe to the spikelets above; glumes narrow or setaceous, 1- to 3-nerved, the nerves prominent, extending into one to several awns, these (when more than one) irregular in size, sometimes mere lateral appendages of the long central awn, sometimes equal, the glume being bifid; lemmas firm, convex on the back, nearly terete, 5-nerved, the nerves obscure, the apex slightly 2-toothed, the central nerve extending into a long, slender, finally spreading awn, sometimes one or more of the lateral nerves also extending into short awns; palea firm, nearly as long as the body of the lemma, the two keels serrulate. Low or rather tall tufted perennials, with bristly spikes. Type species, *Sitanion elymoides* Raf. (*S. hystrix*). Name from Greek *sitos*, grain.

The species are exceedingly variable, being glabrous to densely pubescent and green to glaucous; the glumes and lemmas vary in division and length of awns. Some 15 to 25 variations have been recognized as species, but study of extensive collections shows that most of the characters used in differentiating the forms are inconstant and combine in various ways.

The species are widespread in the Western States but do not form complete stands. They have forage value when young but at maturity the disarticulating joints of the spike, with their pointed rachis joints and long-awned spikelets, are blown about by the wind and often cause injury to stock, penetrating the mouth, nose, and ears, working in by means of the forwardly roughened awns, and causing inflammation. Grazed also after the heads are blown off. The commonest species is *S. hystrix*.

Spike much longer than broad; glumes narrowly lanceolate, 2- to 4-nerved. 1. S. HANSENI.
Spike as broad as long or broader; glumes bristle-like, 1- or obscurely 2-nerved.
Glumes cleft into at least 3 fine divisions ..... 2. S. JUBATUM.
Glumes entire or 2-cleft ..... 3. S. HYSTRIX.

1. Sitanion hanséni (Scribn.) J. G. Smith. HANSEN SQUIRRELTAIL. (Fig. 511.) Culms 60 to 100 cm tall; sheaths and blades glabrous or scabrous to softly pubescent, the blades flat to subinvolute, 2 to 8 mm wide; spike somewhat nodding or flexuous, 8 to 20 cm long; glumes narrowly lanceolate, sometimes bifid, 2- to 3-nerved, long-awned, lower lemmas about 8 mm long, the awn 4 to 5 cm long, divergent when dry and mature. 2l —Open woods and rocky slopes, Idaho to eastern Washington, Utah, and California (fig. 512). Pubescent plants have been differentiated as *S. anomalum* J. G. Smith.

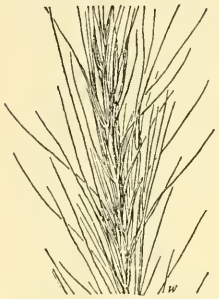

FIGURE 511.—*Sitanion hanseni* × ½. (Suksdorf 5237, Wash.)

2. Sitanion jubátum J. G. Smith. BIG SQUIRRELTAIL. (Fig. 513.) Culms erect to ascending, 20 to 60 cm tall, rarely taller; foliage glabrous or scabrous to white-villous, the blades flat, often becoming involute, mostly not more than 4 mm wide; spike erect, dense, 3 to 10 cm long, thick and bushy from the numerous long slender spreading awns; glumes split into 3 or more long awns; lemmas mostly 8 to 10 mm long, smooth, or scabrous toward apex, the awns and those of the glumes spreading, 3 to 10 cm long, rarely shorter. 2l —Rocky or brushy hillsides and open dry woods and plains, Idaho to eastern Washington, south to Utah, Nevada, and Baja California (fig. 514). Occasionally a few of the glumes in a spike are divided into only 2 awns. Short-awned plants have been differentiated as *S. breviaristatum* J. G. Smith and the more densely pubescent plants as *S. villosum* J. G. Smith.

FIGURE 512.—Distribution of *Sitanion hanseni*.

3. Sitanion hýstrix (Nutt.) J. G. Smith. SQUIRRELTAIL. (Fig. 515.) Culms erect to spreading, rather stiff, 10 to 50 cm tall; foliage from glabrous or puberulent to softly and densely white-pubescent, the blades flat to involute, rather stiffly ascending to spreading, 5 to 20 cm long, 1 to 3 mm wide, rarely as much as 5 mm wide; spike mostly short-exserted or partly included, erect, 2 to 7 cm, rarely 10 cm long or longer, the glumes very narrow, 1- to 2-nerved, the nerves extending into scabrous awns, sometimes bifid to the middle, or bearing a bristle or awn along one margin; lemmas convex, smooth or scabrous to appressed pubescent, sometimes glaucous, the awns of glumes and lemmas widely spreading, 2 to 10 cm long. 2l —Dry hills, plains,

open woods, and rocky slopes, South Dakota to British Columbia,

FIGURE 513.—*Sitanion jubatum.* Pair of spiklets, × 2. (Type.)

south to Missouri, Texas, California, and Mexico (fig. 516). At high altitudes plants often dwarf. Softly pubescent plants have been differentiated as *S. cinereum* J. G. Smith (the pubescence whitish) and *S. velutinum* Piper; short-awned plants as *S. insulare* J. G. Smith and *S. marginatum* Scribn. and Merr.; rather small plants with unusually slender awns as *S. minus* J. G. Smith, and tall plants with coarse spikes as *S. brevifolium* J. G. Smith, *S. longifolium* J. G. Smith, and *S. montanum* J. G. Smith.

FIGURE 514.—Distribution of *Sitanion jubatum.*

45. HÝSTRIX Moench

Spikelets 2- to 4-flowered, 1 to 4 at each node of a continuous flattened rachis, horizontally spreading or ascending at maturity; glumes reduced to short or minute awns, the first usually obsolete, both often wanting in the upper spikelets; lemmas convex, rigid, tapering into long awns, 5-nerved, the nerves obscure except toward the tip; palea

about as long as the body of the lemma. Erect perennials, with flat blades and bristly, loosely flowered spikes. Type species, *Elymus hystrix* L. (*Hystrix patula*). *Hustrix*, Greek name for the porcupine,

FIGURE 515.—*Sitanion hystrix*. Plant, × ½; spikelet and floret, × 3. (Hitchcock 2289, Colo.)

alluding to the bristly spikes. The species have little forage value as they are nowhere abundant. The first species is worthy of cultivation for ornament.

FIGURE 516.—Distribution of *Sitanion hystrix*.

FIGURE 517.—*Hystrix patula*. Plant, × ½; spikelet and floret, × 3. (Moyer, Minn.)

Spikelets soon divergent; lemmas glabrous or pubescent, not hispid. 1. H. PATULA.

Spikelets ascending or appressed; lemmas appressed-hispid. 2. H. CALIFORNICA.

1. Hystrix pátula Moench. BOTTLEBRUSH. (Fig. 517.) Culms slender, 60 to 120 cm tall; sheaths glabrous or scabrous, rarely retrorsely pubescent; blades mostly 7 to 15 mm wide; spike nodding, 8 to 15 cm long, the internodes of the slender rachis 5 to 10 mm long; spikelets mostly in pairs, 1 to 1.5 cm long, horizontally spreading toward maturity; lemmas glabrous or sometimes coarsely pubescent, the awns 1 to 4 cm long, slender, straight. 2l (*H. hystrix* Millsp.)—Moist or rocky woods, Nova Scotia to North Dakota, south to Georgia and Arkansas (fig. 518). Plants with pubescent lemmas have been differentiated as *H. patula* var. *bigeloviana* (Fernald) Deam. Such plants occur throughout the range, except from Delaware, Maryland, and southward.

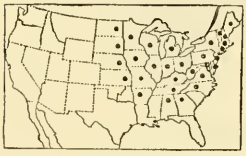

FIGURE 518.—Distribution of *Hystrix patula*.

2. Hystrix califórnica (Boland.) Kuntze. (Fig. 519.) Culms stout, 1 to 2 m tall; sheaths hispid or the upper smooth; blades as much as 2 cm wide; spike 12 to 25 cm long; spikelets usually 3 or 4 at a node, 1.2 to 1.5 cm long, thicker than in *H. patula*, ascending at maturity; lemmas hispidulous, the awn about 2 cm long. 2l —Woods and shaded banks, near the coast, Marin County to Santa Cruz County, Calif. In addition to the sessile spikelets there may be a short branch bearing one or two spikelets.

46. HÓRDEUM L. BARLEY

Spikelets 1-flowered (rarely 2-flowered), 3 (sometimes 2) together at each node of the articulate rachis (continuous in *Hordeum vulgare*), the back of the lemma turned from the rachis, the middle spikelet sessile, the lateral ones pediceled; rachilla disarticulating above the glumes and, in the central spikelet, prolonged behind the palea as a bristle and sometimes bearing a rudimentary floret; lateral spikelets usually imperfect, sometimes reduced to bristles; glumes narrow, often subulate and awned, rigid, standing in front of the spikelet; lemmas rounded on the back, 5-nerved, usually obscurely so, tapering into a usually long awn. Annual or perennial low or rather tall grasses, with flat blades and dense bristly spikes. Type species, *Hordeum vulgare*. *Hordeum*, the old Latin name for barley.

FIGURE 519.—*Hystrix californica*. Spike, × ½; floret, × 3. (Vasey, Calif.)

Aside from the well-known cultivated barley, *H. vulgare*, the species are of relatively minor value. All furnish forage when young but many species are aggressive weeds and some (especially *H. jubatum*) are at maturity injurious to stock because of the sharp-pointed joints of the mature spikes, which pierce the nose and mouth parts.

Plants perennial; awns slender.
Central spikelet usually 2-flowered; lateral spikelets short-pedicellate. 1. H. MONTANENSE.
Central spikelet 1-flowered; lateral spikelets long-pedicellate.
Awns 2 to 5 cm long ..... 2. H. JUBATUM.
Awns mostly less than 1 cm long ..... 3. H. NODOSUM.
Plants annual; awns stouter.
Glumes, or some of them, ciliate ..... 7. H. MURINUM.
Glumes not ciliate.
Glumes of the fertile spikelet dilated above the base ..... 4. H. PUSILLUM.
Glumes not dilated.
Rachis continuous; floret of central spikelet about 1 cm long. 8. H. VULGARE.
Rachis disarticulating; floret of central spikelet less than 1 cm long.
Plant freely branching at base; awns stout, rigid, somewhat divergent at maturity ..... 5. H. GUSSONEANUM.
Plant simple or sparingly branching; awns setaceous, softer and less divergent at maturity ..... 6. H. ADSCENDENS.

1. Hordeum montanénse Beal. (Fig. 520.) Culms 60 to 100 cm tall; sheaths glabrous; blades flat, lax, scabrous, 5 to 8 mm wide; spike nodding, 8 to 17 cm long; central spikelets usually 2-flowered, with a rudiment of a third floret; lateral spikelets short-pedicellate or nearly sessile, usually well developed; glumes slightly broadened above the base, 1 to 3.5 cm long including awns; lower floret of central spikelet about 8 mm long, the awn 1.5 to 3.5 cm long. ♃ (*H. pammeli* Scribn. and Ball.)—Prairies, Illinois, Iowa, South Dakota, Montana, and Wyoming; introduced at St. Jovite, Quebec (fig. 521). Variable and somewhat anomalous; lateral spikelets sometimes with 2 florets. Approaches *Elymus* but lateral spikelets short-pedicellate.

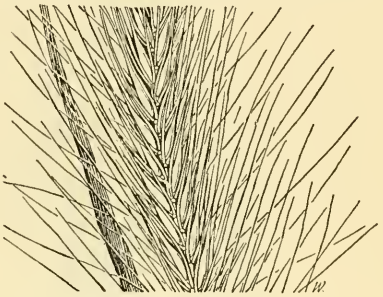

FIGURE 520.—*Hordeum montanense*, × 1. (V. H. Chase 1467, Ill.)

2. Hordeum jubátum L. FOXTAIL BARLEY. (Fig. 522.) Perennial, tufted; culms erect, or decumbent at base, 30 to 60 cm tall; blades 2 to 5 mm wide, scabrous; spike nodding, 5 to 10 cm long, about as wide, soft, pale; lateral spikelets reduced to 1 to 3 spreading awns; glumes of perfect spikelet awnlike, 2.5 to 6 cm long, spreading; lemma 6 to 8 mm long with an awn as long as the glumes. ♃ —Open ground, meadows and waste places, Newfoundland and Labrador to Alaska, south to Maryland, Illinois, Missouri, Texas, California, and Mexico; introduced in the Eastern States (fig. 523). A troublesome weed in the Western States, especially in irrigated meadows. HORDEUM JUBATUM var. CAESPITÓSUM (Scribn.) Hitchc. BOBTAIL BARLEY. Awns 1.5 to 3 cm long. (*H. caespitosum* Scribn.) North Dakota to Alaska, south to Kansas and Arizona.

FIGURE 521.—Distribution of *Hordeum montanense*.

3. Hordeum nodósum L. MEADOW BARLEY. (Fig. 524.) Perennial, tufted; culms erect or sometimes spreading, 10 to 50 cm tall; foliage rather scant, blades flat; spike slender, 2 to 8 cm long; glumes all setaceous, 8 to 15 mm long; lemma of perfect spikelet 7 to 8 mm long, the awn exceeding the glumes; floret of lateral spikelets much reduced. ♃ —Meadows, moist places, and open ground, Montana,

to Alaska, south to New Mexico and California; introduced in several localities in the Eastern States (fig. 525); also in southern South America, and widely dispersed in the Old World. HORDEUM NODOSUM var. BOREÁLE (Scribn. and Smith) Hitchc. As much as 1 m tall; blades as much as 8 mm wide; florets of lateral spikelets larger, sometimes as large as the floret of the central spikelet. Intergrading with *H. nodosum*. 2↓ (*H. boreale* Scribn. and Smith.)—Near the coast, Alaska to Idaho and northern California.

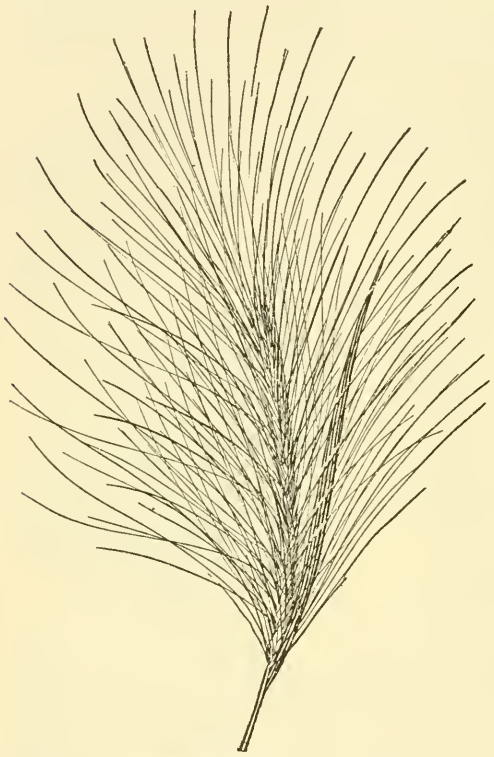

FIGURE 522.—*Hordeum jubatum*, × 1. (Blankinship 189, Mont.)

4. Hordeum pusíllum Nutt. LITTLE BARLEY. (Fig. 526.) Annual; culms 10 to 35 cm tall; blades erect, flat; spike erect, 2 to 7 cm long, 10 to 14 mm wide; first glume of the lateral spikelets and both glumes of the fertile spikelet dilated above the base, attenuate into a slender awn 8 to 15 mm long, the glumes very scabrous; lemma of central spikelet awned, of lateral spikelets awn-pointed. ⊙ —Plains and open, especially alkaline, ground, Delaware to Washington, south to Florida, southern California, and northern Mexico; also Maine; common westward, rare in the Atlantic States; also southern South America (fig. 527). HORDEUM PUSILLUM var. PÚBENS Hitchc. Spikes broader; spikelets pubescent; dilated glumes wider. 2↓ —Texas to Utah and Arizona.

5. Hordeum gussoneánum Parl. MEDITERRANEAN BARLEY. (Fig. 528.) Annual; culms freely branching and spreading or geniculate at base, 15 to 40 cm tall; sheaths and flat blades, especially the lower, more or less pubescent; spike erect, 1.5 to 3 cm long, 10 to 15 mm wide; glumes setaceous, nearly glabrous to scabrous, about 12 mm long; lemma of central spikelet 5 mm long, the awn somewhat longer than the glumes; floret of lateral spikelets reduced, short-awned. ⊙ —Fields and waste places, Utah to British Columbia, Arizona, and California; Massachusetts, New Jersey (fig. 529); introduced from Europe.

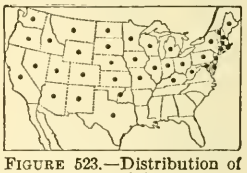

FIGURE 523.—Distribution of *Hordeum jubatum*.

Hordeum marínum Huds. Differing from *H. gussoneanum* in the glabrous dissimilar glumes of the lateral spikelets, the outer subulate, the inner somewhat broader. ⊙ (*H. maritimum* With.)—On ballast, Camden, N. J.; Europe.

FIGURE 524.—*Hordeum nodosum.* Plant, × ½; group of spikelets and floret, × 3. (Whited 433, Wash.)

6. Hordeum adscéndens H.B.K. (Fig. 530.) Annual; culms geniculate at base, 20 to 50 cm tall; spike erect, 3 to 6 cm long excluding awns; glumes all reduced to awns, scabrous, mostly 1.5 to 2 cm long, somewhat spreading, the awn of the fertile floret as long as the glumes. ⊙ —Dry open ground, Arizona and and Mexico.

FIGURE 525.—Distribution of *Hordeum nodosum.*

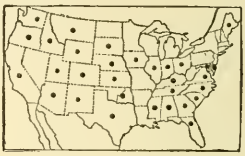

FIGURE 527.—Distribution of *Hordeum pusillum.*

7. Hordeum murínum L. MOUSE BARLEY. (Fig. 531.) Annual; culms bushy-branched, spreading; sheaths and blades smooth; spike 5 to 7 cm long, often partially enclosed by the uppermost inflated sheath; glumes of the central spikelet narrowly fusiform, 3-nerved, long-ciliate on both margins, the nerves scabrous, the awn about 2.5 cm long; glumes of the lateral spikelets unlike, the inner similar to the central ones, the outer setaceous, not ciliate; lemmas all broad, 8 to 10 mm long, the awns somewhat exceeding those of the glumes. ⊙ —Fields, waste places, and open ground, introduced from Europe; here and there in the Eastern States from Maine to Alabama; common on the Pacific coast, Idaho and British Columbia, south to Utah, New Mexico, and California (fig. 532).

FIGURE 526.—*Hordeum pusillum,* ×1. (Hitchcock 11102, S. Dak.)

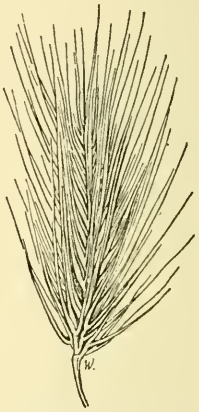

FIGURE 528.—*Hordeum gussoneanum,* × 1. (Hitchcock 2688, Calif.)

8. Hordeum vulgáre L. BARLEY. (Fig. 533.) Annual; culms erect, 60 to 120 cm tall; blades flat, mostly 5 to 15 mm wide; spike erect or nearly so, 2 to 10 cm long, excluding awns; glumes divergent at base, narrow, nerveless, gradually passing into a stout awn; awn of lemma straight, erect, mostly 10 to 15 cm long. ⊙ —Cultivated for the grain, sometimes spontaneous in fields and waste places but not persistent. There are two groups of the cultivated barleys. In the 2-rowed forms (*H. distichon* L.) the lateral spikelets are fairly well developed but sterile. The probable ancestor for at least a part of these is *H. spontaneum* Koch, of Asia. In the second group all the spikelets produce large seed. These are called 6-rowed (*H. hexastichon* L.) or, if the lateral florets overlap, 4-rowed barleys (in European literature). In some varieties the caryopsis is naked. The ancestor of the 6-rowed barleys is not known but probably was similar to some of our cultivated varieties of this group. HORDEUM VULGARE var. TRIFURCÁTUM (Schlecht.) Alefeld, BEARDLESS BARLEY. Awns suppressed or converted into irregular short lobes or teeth.

FIGURE 529.—Distribution of *Hordeum gussoneanum.*

47. LÓLIUM L. Ryegrass

Spikelets several-flowered, solitary, placed edgewise to the continuous rachis, one edge fitting to the alternate concavities, the rachilla disarticulating above the glumes and between the florets; first glume wanting (except on the terminal spikelet and rarely in 1 or 2 spikelets in a spike), the second outward, strongly 3- to 5-nerved, equaling or exceeding the second floret; lemmas rounded on the back, 5- to 7-nerved, obtuse, acute, or awned. Annuals or perennials, with flat blades and slender usually flat spikes. Type species, *Lolium perenne*. *Lolium*, an old Latin name for darnel.

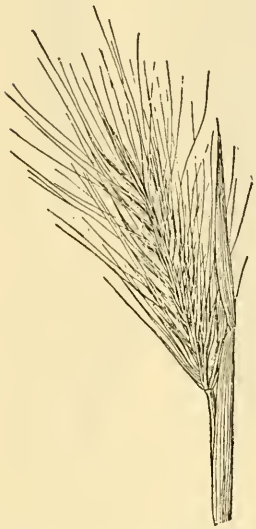

FIGURE 530.—*Hordeum adscendens*, × 1. (Thornber 536, Ariz.)

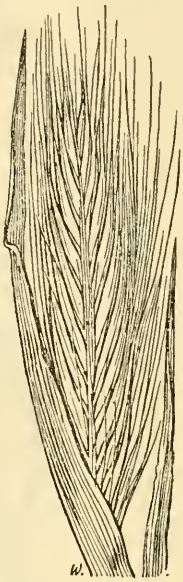

FIGURE 531.—*Hordeum murinum*, ×1. (Mills paugh 4629, Calif.)

Lolium perenne, perennial or English ryegrass, was the first meadow grass to be cultivated in Europe as a distinct segregated species, the meadows and pastures formerly being native species. This and *L. multiflorum*, Italian ryegrass, are probably the most important of the European forage grasses. Both species are used in the United States to a limited extent for meadow, pasture, and lawn. They are of importance in the south for winter forage. In the Eastern States the ryegrasses are often sown in mixtures for parks or public grounds, where a vigorous early growth is required. The young plants can be distinguished from bluegrass by the glossy dark-green foliage. *L. temulentum*, darnel, is occasionally found as a weed in grainfields and waste places. It is in bad repute, because of the presence in the grain of a narcotic poison, said to be due to a fungus. Darnel is supposed to be the plant referred to as the tares sown by the enemy in the parable of Scripture.

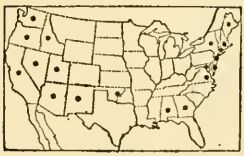

FIGURE 532.—Distribution of *Hordeum murinum*.

Glume shorter than the spikelet; perennials.
- Lemmas nearly or quite awnless ..... 1. L. PERENNE.
- Lemmas, at least the upper, awned ..... 2. L. MULTIFLORUM.

Glume as long as or longer than the spikelet; annuals.
- Spike flat; spikelets much wider than the rachis ..... 3. L. TEMULENTUM.
- Spike subcylindric; spikelets scarcely wider than the rachis. 4. L. SUBULATUM

1. Lolium perénne L. Perennial ryegrass. (Fig. 534, *B*.) Short-lived perennial; culms erect or decumbent at base, 30 to 60 cm tall; foliage glossy, the blades 2 to 4 mm wide; spike often subfalcate, mostly 15 to 25 cm long; spikelets mostly 6- to 10-flowered; lemmas

FIGURE 533.—*Hordeum vulgare.* Plant, × ½; group of spikelets and floret, × 3. Spike of beardless barley (*A*), × ½. (Cult.)

FIGURE 534.—*A*, *Lolium multiflorum*. Plant, × ½; spikelet, × 3; floret, × 5. (Suksdorf 5142, Wash.) *B*, *L. perenne*, × ½. (Kimball, D. C.)

5 to 7 mm long, awnless or nearly so. ♃ —Meadows and waste places, Newfoundland to Alaska and south to Virginia and California, occasionally farther south; cultivated in meadows, pastures, and lawns, introduced from Europe. Also called English ryegrass. LOLIUM PERENNE var. CRISTÁTUM Pers. Spikes ovate, the spikelets crowded, horizontally spreading. ♃ —Open ground, Wilmington, Del., and Washington, D. C.; ballast, Salem and Eola, Oreg.; adventive from Europe.

FIGURE 535.—*A*, *Lolium temulentum*, × ½ (Leiberg 771, Oreg.) *B*, *L. subulatum*, × ½. (Sheldon, Oreg.)

Lolium stríctum Presl. Annual; branched and spreading at base, 10 to 30 cm tall; spike thickish, 5 to 10 cm long, the rachis thick but flattish and angled. ⊙ —Introduced at Berkeley, Calif.; Europe. Resembles *L. subulatum* but the spikelets not sunken in a cylindric rachis.

2. Lolium multiflórum Lam. ITALIAN RYEGRASS. (Fig. 534, *A*.) Differing from *L. perenne* in the more robust habit, larger spikelets, and awned lemmas; spikelets 10- to 20-flowered, 1.5 to 2.5 cm long; lemmas 7 to 8 mm long, at least the upper awned. ♃ (*L. italicum* A. Br.)—About the same range as *L. perenne*, especially common on the Pacific coast where it is often called Australian ryegrass. Introduced from Europe. Scarcely more than a variety of *L. perenne* but generally recognized as distinct agriculturally. A much reduced form has been called forma *microstachyum* Uechtritz.—California.

Lolium rígidum Gaudin. Annual; foliage blue-green; spikes rather stiff; otherwise like *L. multiflorum*. ⊙ —Wheat fields, North Dakota (Milton, Calio); Europe.

3. Lolium temuléntum L. DARNEL. (Fig. 535, *A*.) Annual; culms 60 to 90 cm tall; blades mostly 3 to 6 mm wide; spike strict, 15 to 20 cm long; glume about 2.5 cm long, as long as or longer than the 5- to 7-flowered spikelet, firm, pointed; florets plump, the lemmas as much as 8 mm long, obtuse, awned, the awn as much as 8 mm long. ⊙ —Grainfields and waste places, occasional throughout the eastern United States and rather common on the Pacific coast (fig. 536); introduced from Europe. LOLIUM TEMULENTUM var. LEPTOCHAÉTON A. Br. Lemmas awnless. ⊙ —Washington to California, occasional on the Atlantic coast, Maine to Texas; introduced from Europe.

FIGURE 536.—Distribution of *Lolium temulentum*.

4. Lolium subulátum Vis. (Fig. 535, *B*.) Annual; culms freely branching at base, stiffly spreading or prostrate; foliage scant, blades short; spike subcylindric, rigid, often curved; spikelets sunken in the excavations of the rachis, the florets partly hidden by the appressed obtuse strongly nerved glume; lemmas 5 mm long. ⊙ —On ballast, near Portland, Oreg.; introduced from Europe.

Nárdus stricta L. Slender tufted perennial; sheaths crowded at the base of the plant; blades slender, involute, rather stiff; spike slender, 1-sided, 3 to 8 cm long; spikelets 1-flowered; first glume

wanting; second glume minute; lemma narrow, acuminate or short-awned, scabrous. ⊙ —Introduced in Newfoundland, New Hampshire (Waterville) and New York (Fulton County); Europe.

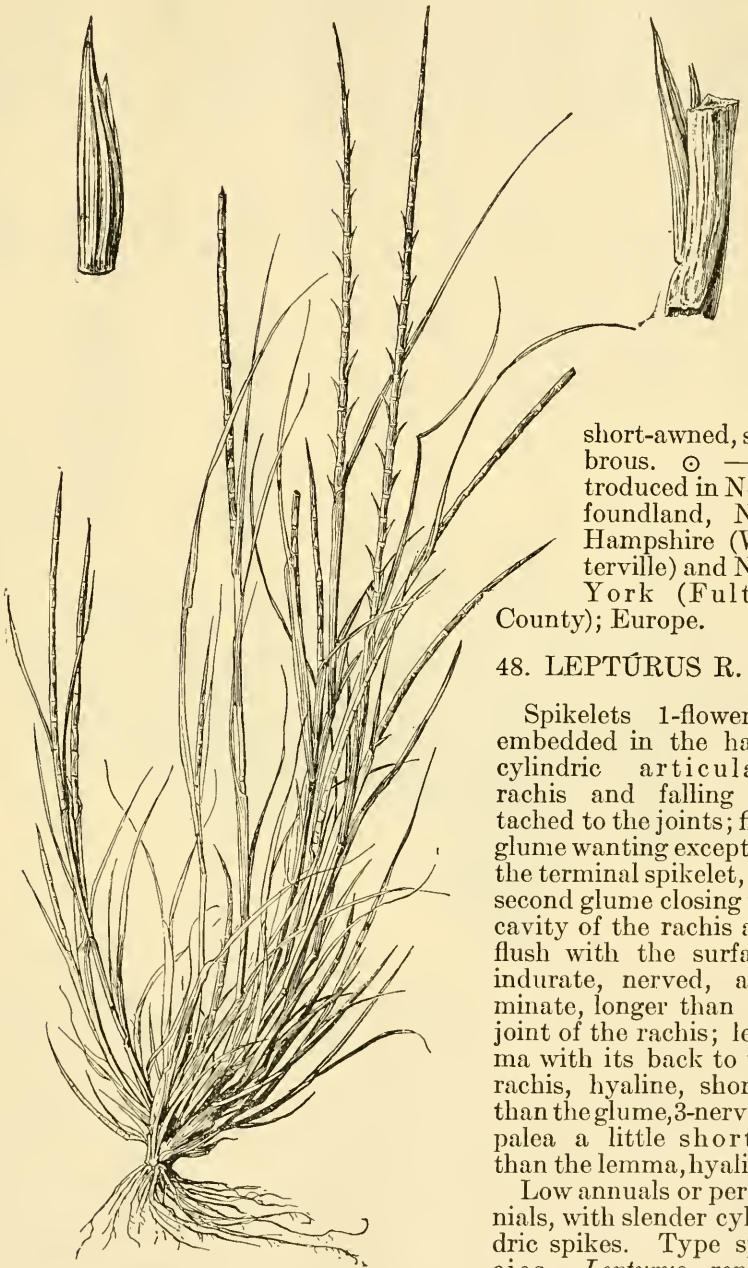

FIGURE 537.—*Lepturus cylindricus*. Plant, × ½; rachis joint and spikelet, × 5. (Parish 4446, Calif.)

48. LEPTÚRUS R. Br.

Spikelets 1-flowered, embedded in the hard, cylindric articulate rachis and falling attached to the joints; first glume wanting except on the terminal spikelet, the second glume closing the cavity of the rachis and flush with the surface, indurate, nerved, acuminate, longer than the joint of the rachis; lemma with its back to the rachis, hyaline, shorter than the glume, 3-nerved; palea a little shorter than the lemma, hyaline.

Low annuals or perennials, with slender cylindric spikes. Type species, *Lepturus repens* (Forst.) R. Br. Name from Greek *leptos*, slender, and *oura*, tail, alluding to the slender inflorescence.

1. Lepturus cylíndricus (Willd.) Trin. THINTAIL. (Fig. 537.) Annual; culms bushy-branched, spreading or prostrate, 10 to 30 cm tall; spike curved, narrowed upward; glume 6 mm long, acuminate; lemma 5 mm long, pointed; axis disarticulating at maturity, the spikelets remaining attached to the joints. ⊙ —Salt marshes, San Francisco Bay, Calif., south to San Diego and Santa Catalina Island; introduced from the Old World.

49. PHOLIÚRUS Trin.

Spikelets 1- or 2-flowered, embedded in the cylindric articulate rachis and falling attached to the joints; glumes two, placed in front of the spikelet and enclosing it, coriaceous, 5-nerved, acute, asymmetric, appearing like halves of a single split glume; lemma with its back to the rachis, smaller than the glumes, hyaline, 1-nerved; palea a little shorter

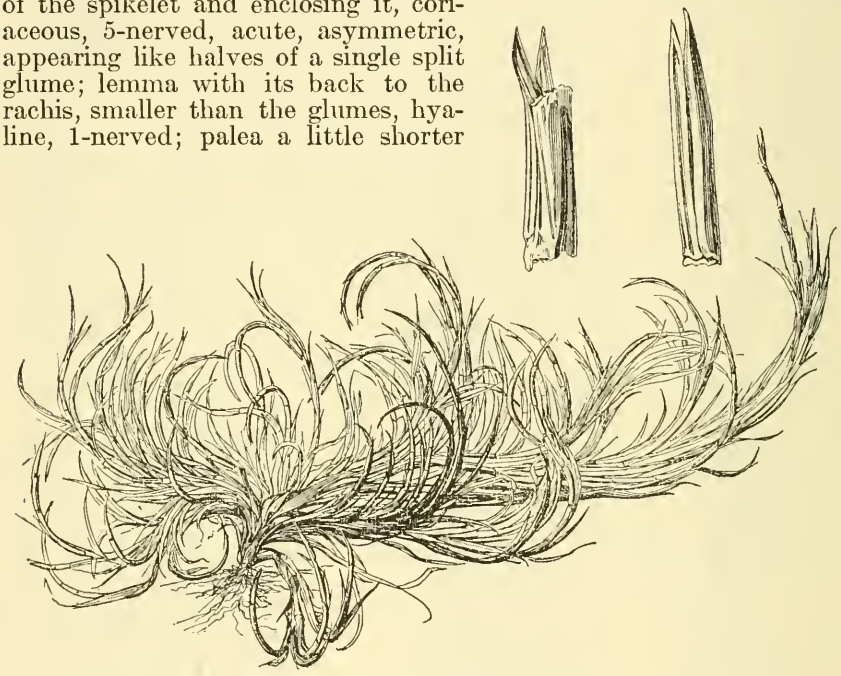

FIGURE 538.—*Pholiurus incurvus.* Plant, × ½; rachis joint and spikelet, × 5. (Trask, Calif.)

than the lemma, hyaline. Low annuals, with slender cylindric spikes. Type species, *Pholiurus pannonica* (Host) Trin. Name from Greek *pholis*, horny scale, and *oura*, tail, alluding to the coriaceous spikes.

1. Pholiurus incúrvus (L.) Schinz and Thell. SICKLE GRASS. (Fig. 538.) Culms tufted, decumbent at base, 10 to 20 cm tall; blades short, narrow; spike 7 to 10 cm long, cylindric, curved; spikelets 7 mm long, pointed. ⊙ (*P. incurvatus* Hitchc.)—Mud flats and salt marshes along the coast, New Jersey to Virginia; California; Portland, Oreg. (fig. 539); introduced from Europe.

FIGURE 539.—Distribution of *Pholiurus incurvus.*

50. SCRIBNÉRIA Hack.

Spikelets 1-flowered, solitary, appressed flatwise against the somewhat thickened continuous rachis, the rachilla disarticulating above the glumes, prolonged as a very minute hairy stipe; glumes equal, narrow, firm, acute, keeled on the outer nerves, the first 2-nerved, the second 4-nerved; lemma shorter than the glumes, membranaceous, obscurely nerved, the apex short-bifid, the faint midnerve extending as a slender awn; palea about as long as the lemma; stamen 1. Low annual, with slender cylindric spikes. Type species, *Scribneria bolanderi*. Named for F. Lamson-Scribner.

1. Scribneria bolandéri (Thurb.) Hack. (Fig. 540.) Culms branching at base, erect or ascending, 7 to 30 cm tall; foliage scant, the blades subfiliform; ligule about 3 mm long; spike about 1 mm thick, usually one third to half the entire height of the plant, the internodes 4 to 6 mm long; spikelets about 7 mm long; lemmas pubescent at base, the awn erect, 2 to 4 mm long. ⊙ —Sandy or sterile ground, in the mountains, Washington to California; rare or overlooked, very inconspicuous

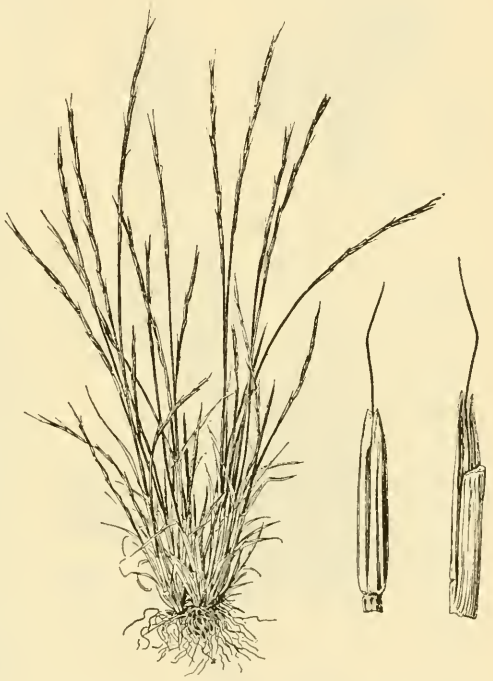

FIGURE 540.—*Scribneria bolanderi*. Plant, × ½; rachis joint and spikelet, × 5. (Suksdorf 217, Wash.)

TRIBE 4. AVENEAE

51. SCHÍSMUS Beauv.

Spikelets several-flowered, the rachilla disarticulating above the glumes and between the florets; glumes subequal, longer than the first floret, usually as long as the spikelet, with white membranaceous margins; lemmas broad, rounded on the back, several-nerved, pilose along the lower part of the margin, bidentate; palea broad, hyaline, the nerves at the margin. Low tufted annuals with filiform blades and small panicles. Type species, *Schismus marginatus* Beauv. (*S. barbatus*). Name from Greek, *schismos*, a splitting, referring to the bidentate lemmas. This genus has usually been placed in the tribe Festuceae, but its characters place it more naturally in the tribe Aveneae.

1. Schismus barbátus (L.) Chase. (Fig. 541.) Culms tufted, erect to prostrate-spreading, 5 to 35 cm tall; blades usually less than

10 cm long; panicle oval to linear, 1 to 4 cm long, usually rather dense, pale or purplish; pedicels slender, finally disarticulating at base and falling with the spikelet or with the glumes; spikelets about 5-flowered, 5 to 6 mm long; glumes about equaling the spikelet, 5- to 7-nerved, acute; lemmas about 2 mm long, 9-nerved, the summit hyaline, nerveless, the margin appressed pilose on the lower half, the teeth minute, sometimes with a minute mucro between, the rachilla joints slender, flexuous; palea concave, as broad as the lemma and about as long. ⊙ —Open ground in yards, along roadsides, and in dry river beds; introduced in southern Arizona; southern Europe to India and South Africa. Locally dominant, an excellent forage grass in winter.

FIGURE 541.—*Schismus barbatus*. Plant, × ½; spikelet and florets, × 5. (Peebles and Harrison, 846, Ariz.)

52. KOELÉRIA Pers.

Spikelets 2- to 4-flowered, compressed, the rachilla disarticulating above the glumes and between the florets, prolonged beyond the perfect florets as a slender bristle or bearing a reduced floret at the tip; glumes usually about equal in length, unlike in shape, the lower narrow, sometimes shorter, 1-nerved, the upper wider than the lower, broadened above the middle, 3- to 5-nerved; lemmas somewhat scarious, shining, the lowermost a little longer than the glume, obscurely 5-nerved, acute or short-awned, the awn, if present, borne just below the apex. Slender, low or rather tall annuals or perennials, with narrow blades and shining spikelike panicles. Type species, *Koeleria cristata*. Named for G. L. Koeler.

Koeleria cristata is a good forage grass and is a constituent of much of the native pasture throughout the Western States. The plants, however, are rather scattering.

Plants perennial ..... 1. K. CRISTATA.
Plants annual ..... 2. K. PHLEOIDES.

1. Koeleria cristáta (L.) Pers. JUNEGRASS. (Fig. 542, *A*.) Tufted perennial; culms erect, puberulent below the panicle, 30 to 60 cm tall; sheaths, at least the lower, pubescent; blades flat or involute, glabrous or, especially the lower, pubescent, 1 to 3 mm wide; panicle erect, spikelike, dense (loose in anthesis), often lobed, interrupted, or sometimes branched below, 4 to 15 cm long, tapering at the summit; spikelets mostly 4 to 5 mm long; glumes and lemmas scaberulous, 3

to 4 mm long, sometimes short-awned, the rachilla joints very short. 2|. —Prairie, open woods, and sandy soil, Ontario to British Columbia, south to Delaware, Missouri, Louisiana, California, and Mexico

FIGURE 542.—*A Koeleria cristata.* Plant, × ½; glumes and floret, × 10. (Bebb 2862, Ill.) *B, K. phleoides.* Panicle, × 1; glumes and floret, × 10. (Heller 11417, Calif.)

(fig. 543); widely distributed in the temperate regions of the Old World. Variable; several American varieties have been proposed, but the forms are inconstant and intergrading and it is not practicable

to distinguish definite varieties. On the Pacific coast there is a rather large loosely tufted form (*K. cristata* var. *longifolia* Vasey) with long narrow or involute blades and somewhat open panicle.

2. Koeleria phleoides (Vill.) Pers. (Fig. 542, *B.*) Annual; culms 15 to 30 cm tall, smooth throughout; sheaths and blades sparsely pilose; panicle dense, spikelike, 2 to 7 cm long, obtuse; spikelets 2 to 4 mm long; glumes acute; lemmas short-awned from a bifid apex; glumes and lemmas in the typical form papillose-hirsute on the back, but commonly papillose only. ⊙ —Introduced from Europe at Pensacola, Fla., Mobile, Ala., Portland, Oreg., and at several points in California.

53. SPHENÓPHOLIS Scribn. Wedgegrass

Spikelets 2- or 3-flowered, the pedicel disarticulating below the glumes, the rachilla produced beyond the upper floret as a slender bristle; glumes unlike in shape, the first narrow, usually acute, 1-nerved, the second broadly obovate, 3- to 5-nerved, the nerves sometimes obscure, mostly somewhat coriaceous, the margin scarious; lemmas firm, scarcely nerved, awnless or rarely with an awn from just below the apex, the first a little shorter or a little longer than the second glume; palea hyaline, exposed. Slender perennials (rarely annual) with usually flat blades and narrow shining panicles. Type species, *Sphenopholis obtusata.* Name from Greek *sphen*, wedge, and *pholis*, horny scale, alluding to the hard obovate second glume.

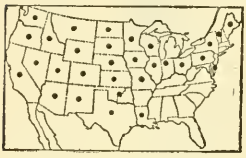

FIGURE 543.—Distribution of *Koeleria cristata.*

All the species are forage grasses but are usually not abundant. The most important are *S. intermedia* and *S. obtusata.*

Panicle dense, usually spikelike, erect or nearly so; second glume subcucullate. 1. S. OBTUSATA.
Panicle not dense, lax, nodding, from very slender to many-flowered, but not spikelike.
  Spikelets awned ..... 6. S. PALLENS.
  Spikelets awnless (rarely awned in *S. filiformis*).
    Second glume acute or subacute; panicle many-flowered.
      Second glume about 2.5 mm long ..... 2. S. INTERMEDIA.
      Second glume about 3.5 mm long ..... 3. S. LONGIFLORA.
    Second glume broadly rounded at summit; panicle relatively few-flowered.
      Blades rarely more than 10 cm long, flat, 2 to 5 mm wide. 4. S. NITIDA.
      Blades elongate, flat to subinvolute, mostly less than 2 mm wide. 5. S. FILIFORMIS.

1. Sphenopholis obtusáta (Michx.) Scribn. PRAIRIE WEDGEGRASS. (Fig. 544, *A.*) Culms erect, tufted, 30 to 100 cm tall; sheaths glabrous to finely retrorsely pubescent; blades flat, glabrous, scabrous, or pubescent, mostly 2 to 5 mm wide; panicle erect or nearly so, dense, spikelike to interrupted or lobed, rarely slightly looser, 5 to 20 cm long; spikelets 2.5 to 3.5 mm long, the two florets closer together than in the other species; second glume very broad, subcucullate, somewhat inflated at maturity, 5-nerved, scabrous; lemmas minutely papillose in texture, rarely mucronate or with a short straight awn, the first about 2.5 mm long. 2l —Open woods, old fields, moist ground, and prairies, Maine to British Columbia, south to Florida, Arizona, and California; Mexico; Dominican Republic. Variable in

FIGURE 544.—*A*, *Sphenopholis obtusata*. Plant, × ½; glumes and floret, × 10. (Hitchcock 1453, N. C.) *B*, *S. intermedia*. Panicle, × 1; glumes and floret, × 10. (Clark 1785, Ind.)

size and in denseness of panicle. Sometimes annual or flowering the first season. Specimens with less dense and lobed panicles may be distinguished from denser panicled specimens of *S. intermedia* by the broader, firmer, subcucullate second glume and more approximate florets.

2. Sphenopholis intermédia (Rydb.) Rydb. SLENDER WEDGE-GRASS. (Fig. 544, *B.*) Culms erect in small tufts, 30 to 120 cm tall; sheaths glabrous or pubsecent; blades flat, often elongate, lax, mostly 2 to 6 mm wide, sometimes wider, mostly scaberulous, occasionally sparsely pilose; panicle nodding, from rather dense to open, mostly 10 to 20 cm long, the branches spikelet-bearing from base; spikelets 3 to 4 mm long; second glume relatively thin, acute or subacute, about 2.5 mm long; lemmas subacute, rarely mucronate, smooth or rarely very minutely roughened, mostly 2.5 to 3 mm long. 2l —Damp or rocky woods, slopes, and moist places, Newfoundland to British Columbia, south to Florida and Arizona; Tanana Hot Springs, Alaska. (Fig. 545.) Delicate plants with small panicles resembling *S. nitida* may be distinguished by the very narrow first glume, the acute to subacute second glume and lemmas, and usually by the glabrous foliage. Plants with rather dense panicles resembling *S. obtusata* may be distinguished by the thinner, less rounded, more compressed second glume. This is the species called *Sphenopholis pallens* (Spreng.) Scribn. in recent manuals. Sprengel's description of *Aira pallens* shows that Scribner misapplied the name (see no. 6).

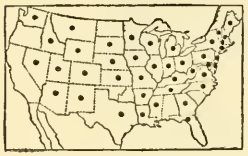

FIGURE 545.—Distribution of *Sphenopholis intermedia.*

FIGURE 546.—*Sphenopholis longiflora.* Panicle, × 1; glumes and floret, × 10. (Nealley, Tex.)

3. Sphenopholis longiflóra (Vasey) Beal. (Fig. 546.) Culms relatively stout, erect from a decumbent base, 40 to 70 cm tall; lower sheaths puberulent, the others glabrous; blades thin, flat, scaberulous, 5 to 18 cm long, 3 to 8 mm wide; panicle many-flowered, rather loose, slightly nodding, 10 to 18 cm long; spikelets mostly 2-flowered, the rachilla hispidulous; glumes very scabrous on the green part, the second thin, acute, about 3.5 mm long; lemmas smooth, scaberulous toward the tip, the first about 4 mm long. 2l —Known only from Houston, Tex. Differing from *S. intermedia* in the larger spikelets and broader blades, and in the more tapering lemmas.

4. Sphenopholis nítida (Spreng.) Scribn. (Fig. 547.) Culms tufted, leafy at base, slender, shining, 30 to 70 cm tall; sheaths and blades mostly softly pubescent, occasionally glabrous, the blades 2 to 5 mm wide, 3 to 10 cm long, the basal sometimes longer; panicle rather few-flowered, mostly 8 to 12 cm long, the filiform branches

distant, ascending, spreading in anthesis; spikelets 3 to 3.5 mm long; glumes about equal in length, usually nearly as long as the first floret, the first glume broader than in the other species, the second broadly rounded at summit, at least the second lemma scabrous-papillose. ♃ —Dry or rocky woods, Massachusetts to North Dakota, south to Florida and Texas (fig. 548).

FIGURE 548.—Distribution of *Sphenopholis nitida.*

FIGURE 547.—*Sphenopholis nitida.* Panicle, × 1; glumes and florets, × 10. (House 1920, S. C.)

5. Sphenopholis filiformis (Chapm.) Vasey. (Fig. 549.) Culms erect, very slender, 30 to 60 cm tall; blades slender, lax, flat to subinvolute, mostly less than 2 mm wide; panicle slender, often nodding, 5 to 15 cm long, the short branches rather distant, erect or ascending; spikelets 3 to 4 mm long, the two florets rather distant; second glume broadly rounded at summit, about 2 mm long; lemmas obtuse to subacute, rarely with a short spreading awn; the first smooth, the second minutely roughened. ♃ —Dry soil, Coastal Plain, North Carolina to Florida, Tennessee, and eastern Texas (fig. 550). Occasional awned lemmas, either the first or second, are found in some panicles.

FIGURE 549.—*Sphenopholis filiformis.* Panicle, × 1; glumes and florets, × 10. (Hitchcock 1044, Ala.)

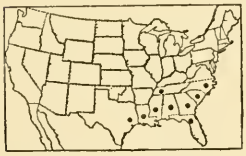

FIGURE 550.—Distribution of *Sphenopholis filiformis.*

6. Sphenopholis pállens (Spreng.) Scribn. (Fig. 551.) Culms erect, about 60 cm tall; lower sheaths minutely pubescent, the upper glabrous; blades flat, glabrous, 1 to 2 mm wide; panicle narrow, nodding, loose, or somewhat compact, 15 to 25 cm long, the branches ascending, the lower distant; spikelets about as in *S. intermedia,* 2- or 3-flowered, 3 to 3.5 mm long; second floret scaberulous, usually awned just below the apex, the awn scabrous, geniculate, 1 to 2 mm long. ♃ (*Eatonia aristata* Scribn. and Merr.) The type of *Aira pallens* Spreng.

has not been examined, but it was received from Muhlenberg and may be assumed to be the same as the specimen in the Muhlenberg Herbarium described under *Aira pallens* by Muhlenberg. The only other specimen known is the type of *Eatonia aristata* collected in South Carolina by Curtiss.

FIGURE 551.—*Sphenopholis pallens*, × 10. (Curtiss, S. C.)

54. TRISÉTUM Pers. TRISETUM

Spikelets usually 2-flowered, sometimes 3- to 5-flowered, the rachilla prolonged behind the upper floret, usually villous; glumes somewhat unequal, acute, the second usually longer than the first floret; lemmas usually short-bearded at the base, 2-toothed at apex, the teeth often awned, bearing from the back below the cleft apex a straight and included or usually bent and exserted awn (awnless or nearly so in *Trisetum melicoides* and *T. wolfii*). Tufted perennials (except *Trisetum interruptum*), with flat blades and open or usually contracted or spikelike shining panicles. Type species, *T. flavescens*. Name from Latin *tri*, three, and *setum*, bristle, alluding to the three awns of the lemma.

Several of the species are valuable for grazing. *Trisetum spicatum* constitutes an important part of the forage on alpine and subalpine slopes, and *T. wolfii* at medium altitudes.

Spikelets disarticulating below the glumes.
- Plants perennial; panicle lax, somewhat open---- 9. T. PENNSYLVANICUM.
- Plants annual; panicle narrow, dense, interrupted---- 10. T. INTERRUPTUM.

Spikelets disarticulating above the glumes.
- Awn included within the glumes, or wanting.
  - Panicle rather lax, nodding---------- 1. T. MELICOIDES.
  - Panicle rather dense, erect---------- 2. T. WOLFII.
- Awn exserted.
  - Awn straight (see also *T. montanum* var. *shearii*)- 3. T. ORTHOCHAETUM.
  - Awn geniculate.
    - Panicle dense, spikelike, sometimes slightly interrupted below; plants densely tufted---------- 5. T. SPICATUM.
    - Panicle loose and open to contracted, but not spikelike; plants in small tufts or solitary.
      - Panicle relatively few-flowered, loose, lax or drooping, the filiform branches naked below; florets distant-------- 4. T. CERNUUM.
      - Panicle many-flowered, from rather loose to dense and interrupted; florets not distant.
        - Panicle yellowish; spikelets mostly 3- or 4-flowered; introduced. 8. T. FLAVESCENS.
        - Panicle pale green, sometimes purplish-tinged; spikelets usually 2-flowered.
          - Spikelets about 8 mm long---------- 6. T. CANESCENS.
          - Spikelets 5 to 6 mm long---------- 7. T. MONTANUM.

1. Trisetum melicoides (Michx.) Scribn. (Fig. 552.) Culms 50 to 100 cm tall; sheaths pubescent or scabrous; blades 2 to 8 mm wide, scabrous, sometimes pubescent on the upper surface; panicle somewhat open, nodding, 10 to 20 cm long, the branches slender, ascending, lax or drooping, as much as 7 cm long, rather closely flowered above the middle; spikelets scaberulous, 6 to 7 mm long; glumes 4 to 6 mm long, the second longer and broader; lemmas acute, 5 to 6 mm long, rarely with a minute awn just below the tip, the rachilla and callus hairs 1 to 2 mm long. 2l —River banks, lake shores, mostly in gravelly ground, Newfoundland to Vermont, Michigan, and Wisconsin (fig. 553).

2. Trisetum wólfii Vasey. WOLFS TRISETUM. (Fig. 554.) Culms erect, 50 to 100 cm tall, loosely tufted, sometimes with short rhizomes; sheaths scabrous, rarely the lower pilose; blades flat, scabrous, rarely pilose on the upper surface, 2 to 4 mm wide; panicle erect, rather dense but scarcely spikelike, green or pale, sometimes a little purplish, 8 to 15 cm long; spikelets 5 to 7 mm long, 2-flowered, sometimes 3-flowered; glumes nearly equal, acuminate, about 5 mm long; lemmas obtusish, scaberulous, 4 to 5 mm long, awnless or with a minute awn below the tip, the callus hairs scant, about 0.5 mm long, the rachilla internode about 2 mm long, rather sparingly long-villous. 2l —Meadows and moist ground, at medium altitudes in the mountains, Montana to Washington, south to New Mexico and California.

FIGURE 552.—*Trisetum melicoides.* Panicle, × 1; glumes and floret, × 5. (Pringle, Vt.)

3. Trisetum orthochaétum Hitchc. (Fig. 556.) Culms solitary, erect, slender, 110 cm tall;. sheaths glabrous; blades flat, scabrous, 8 to 20 cm long, 3 to 7 mm wide; panicle slightly nodding, lax, pale, about 18 cm long, the filiform branches loosely ascending, naked below, the lower fascicled, as much as 8 cm long; spikelets short-pediceled, somewhat appressed, mostly 3-flowered, 8 to 9 mm long excluding awns, the rachilla appressed-silky; glumes acuminate, about 6 mm long, the second wider; lemmas rounded on the back, minutely scaberulous on the upper part, obscurely 5-nerved, the callus short-pilose, the apex acute, erose-toothed, awned about 2 mm below the tip, the awn straight or nearly so, exceeding the lemma about 3 mm. 2l —Known only from boggy meadows, Lolo Hot Springs, Bitterroot Mountains, Mont.

FIGURE 553.—Distribution of *Trisetum melicoides.*

FIGURE 554.—*Trisetum wolfii.* Panicle, × 1; glumes and floret, × 5. (Swallen 809, Calif.)

4. Trisetum cérnuum Trin. NODDING TRISETUM. (Fig. 557.) Culms rather lax, 60 to 120 cm tall; sheaths glabrous to sparsely pilose; blades thin, flat, lax, scabrous, 6 to 12 mm wide; panicle open, lax, drooping, 15 to 30 cm long, the branches verticillate, filiform, flexuous, spikelet-bearing toward the ends; spikelets 6 to 12 mm long, with usually 3 distant florets, the first longer than the second glume; first glume narrow, acuminate, 1-nerved, 0.5 to 2 mm long, the second broad, 3-nerved, 3 to 4 mm long, occasionally reduced; lemma 5 to 6

FIGURE 555.—Distribution of *Trisetum wolfii.*

mm long, the teeth setaceous, the hairs of the callus 0.5 to 1 mm long, of the rachilla as much as 2 mm long, the awns slender, curved, flexuous or loosely spiral, mostly 5 to 10 mm long, attached 1 to 2 mm below tip. 2l —Moist woods, Alberta to southeastern Alaska, south to western Montana and northern California (fig. 558).

FIGURE 556.—*Trisetum orthochaetum.* Panicle, × 1; glumes and floret, × 5. (Type.)

5. Trisetum spicátum (L.) Richt. SPIKE TRISETUM. (Fig. 559, *A*.) Culms densely tufted, erect, 15 to 50 cm tall, glabrous to puberulent; sheaths and usually the blades puberulent; panicle dense, usually spikelike, often interrupted at base, pale or often dark-purple,

FIGURE 557.—*Trisetum cernuum.* Panicle, × 1; glumes and floret, × 5. (Elmer 1946, Wash.)

5 to 15 cm long; spikelets 4 to 6 mm long; glumes somewhat unequal in length, glabrous or scabrous except the keels, or sometimes pilose, the first narrow, acuminate, 1-nerved, the second broader, acute, 3-nerved; lemmas scaberulous, 5 mm long, the first longer than the glumes, the teeth setaceous; awn attached about one third below the tip, 5 to 6 mm long, geniculate, exserted. 2l —Alpine meadows and slopes, Arctic America, southward to Connecticut, Pennsylvania, northern Michigan and Minnesota, in the mountains to New Mexico and California; also on Roan Mountain, N. C. (fig. 560); high mountains through Mexico to the antarctic regions of South America; arctic and alpine regions of the Old World. In northern regions the species descends to low altitudes. Exceedingly variable; several varieties have been proposed, but the characters used to differentiate them are variable and are not correlated. Two rather more outstanding varieties, both intergrading with the species are: *T. spicatum* var. *molle* (Michx.) Beal, with densely pubescent foliage, and *T. spicatum* var. *congdoni* (Scribn. and Merr.) Hitchc., a nearly glabrous alpine form with slightly larger spikelets.

FIGURE 558.—Distribution of *Trisetum cernuum.*

FIGURE 559.—*A*, *Trisetum spicatum*. Plant, × ½; spikelet and floret, × 5. (Rydberg and Bessey 3593, Mont.); *B*, *T. canescens*. Panicle, × 1; glumes and floret, × 5. (Hitchcock 3409, Calif.)

6. Trisetum canéscens Buckl. TALL TRISETUM. (Fig. 559, *B.*) Culms erect, or decumbent at base, 60 to 120 cm tall; sheaths, at least the lower, sparsely to densely and softly retrorse-pilose, rarely scabrous only; blades flat, scabrous or canescent, sometimes sparsely pilose, mostly 2 to 7 mm wide; panicle narrow, usually loose, sometimes interrupted and spike-like, 10 to 25 cm long; spikelets about 8 mm long, 2- or 3-flowered, the florets not so distant as in *T. cernuum;* glumes smooth, except the keel, the first narrow, acuminate, the second broad, acute, 3-nerved, 5 to 7 mm long; lemmas rather firm, scaberulous, the upper exceeding the glumes, 5 to 6 mm long, the teeth aristate, the callus hairs rather scant, the rachilla hairs copious; awn geniculate, spreading, loosely twisted below, attached one-third below the tip, usually about 12 mm long. 2l —Mountain meadows, moist ravines and along streams, Montana to British Columbia, south to central California (fig. 561).

FIGURE 560.—Distribution of *Trisetum spicatum.*

FIGURE 562.—*Trisetum montanum.* Panicle, × 1; glumes and floret, × 5. (Type.)

FIGURE 561.—Distribution of *Trisetum canescens.*

Plants with less pubescent sheaths and looser panicles resemble *T. cernuum* in that the spikelets are commonly 3-flowered, the florets distant. Plants with more velvety foliage and narrow panicles with short densely flowered branches, the lower in distant fascicles, have been differentiated as *T. projectum* Louis-Marie. Intergrading specimens are more numerous than the extreme described.

FIGURE 563.—*Trisetum flavescens.* Panicle, × 1; floret, × 5. (Grant 26, Wash.)

7. Trisetum montánum Vasey. (Fig. 562.) Resembling *T. canescens,* on the average smaller, the blades narrower; sheaths from nearly glabrous to softly retrorsely pubescent; panicles smaller than usual in *T. canescens,* more uniformly rather dense, often purple-tinged; spikelets 5 to 6 mm long, the glumes and lemmas thinner than in *T. canescens,* the awn more delicate, 5 to 8 mm long. 2l —Mountain meadows, gulches and moist places on mountain slopes, between 2,000 and 3,300 m, Colorado, Utah, and New Mexico. A form

with purplish panicles and erect awns only 2 to 3 mm long, known from a single collection near Silverton, Colo., has been differentiated as *T. montanum* var. *shearii* Louis-Marie.

8. Trisetum flavéscens (L.) Beauv. (Fig. 563.) Resembling *T. canescens;* sheaths glabrous or the lower sparsely pilose; panicle usually yellowish, many-flowered, somewhat condensed; spikelets mostly 3- or 4-flowered; lemmas 4 to 6 mm long. 2l —Waste places, Vermont, New York, Missouri, Colorado, Washington, California, and probably other States; introduced from Europe.

Trisetum aúreum (Ten.) Ten. Annual; culms 10 to 20 cm tall; panicle ovate, contracted, 2 to 3 cm long; spikelets 3 mm long; awns 2 to 3 mm long. ⊙ —Ballast, Camden, N. J.; Europe.

FIGURE 564.—*Trisetum pennsylvanicum.* Panicle, × 1; glumes and florets, × 5. (Heller 4800, Pa.)

9. Trisetum pennsylvánicum (L.) Beauv. (Fig. 564.) Culms slender, weak, usually subgeniculate at base, 50 to 100 cm tall; sheaths glabrous or rarely scabrous; blades flat, scabrous, 2 to 5 mm wide; panicle narrow, loose, nodding, 10 to 20 cm long; pedicels disarticulating about the middle or toward the base; spikelets 5 to 7 mm long, 2-flowered, the long rachilla joints slightly hairy; glumes mostly 4 to 5 mm long, acute, the second wider; lemmas acuminate, the first usually awnless, the second awned below the 2 setaceous teeth, the awn horizontally spreading, 4 to 5 mm long. 2l — Swamps and wet places, Massachusetts to Ohio, south on the Coastal Plain to Florida and west to Tennessee and Louisiana (fig. 565).

FIGURE 565.—Distribution of *Trisetum pennsylvanicum.*

10. Trisetum interrúptum Buckl. (Fig. 566.) Annual; culms tufted, sometimes branching, erect or spreading, 10 to 40 cm tall; sheaths often scabrous or pubescent; blades flat, sometimes pubescent, 1 to 4 mm wide, mostly 3 to 10 cm long; panicle narrow, interrupted, from slender to rather dense but scarcely spikelike, 5 to 12 cm long, sometimes with smaller axillary panicles; pedicels disarticulating a short distance below the summit; spikelets about 5 mm long, 2-flowered, the second floret sometimes rudimentary; glumes about equal in length, acute, 4 to 5 mm long, the first 3-nerved, the second a little broader, 5-nerved; lemmas acuminate with 2 setaceous teeth, the awns attached above the middle, flexuous, 4 to 8 mm long, that of the first lemma often shorter and straight. ⊙ —Open dry ground, Texas to Colorado and Arizona (fig. 567).

FIGURE 566.—*Trisetum interruptum.* Panicle, × 1; glumes and floret, × 5. (Jermy, Tex.)

55. DESCHÁMPSIA Beauv. Hairgrass

Spikelets 2-flowered, disarticulating above the glumes and between the florets, the hairy rachilla prolonged beyond the upper floret as a stipe, this sometimes bearing a reduced floret; glumes about equal, acute or acutish, membranaceous; lemmas thin, truncate and 2- to 4-toothed at summit, bearded at base, bearing a slender awn from or below the middle, the awn straight, bent or twisted. Low or moderately tall annuals or usually perennials, with shining pale or purplish spikelets in narrow or open panicles. Standard species, *Deschampsia caespitosa*. Included in *Aira* by some authors. Named for Deschamps.

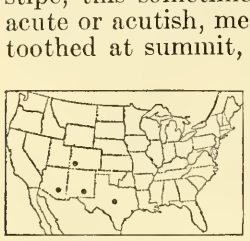

FIGURE 567.—Distribution of *Trisetum interruptum*.

Deschampsia caespitosa is often the dominant grass in mountain meadows, where it furnishes excellent forage.

Plants annual; foliage very scant ..... 1. D. DANTHONIOIDES.
Plants perennial; foliage not scant, one-third to half the entire length of the culm.
Panicle narrow, the distant branches appressed. Blades filiform, lax. 2. D. ELONGATA.
Panicle open or contracted, if narrow, not more than one-fourth the length of the culm.
Blades thin, flat; glumes exceeding the florets ..... 3. D. ATROPURPUREA.
Blades firm or filiform; glumes not exceeding the upper floret.
Blades filiform, flexuous; awn exserted, geniculate, twisted. 4. D. FLEXUOSA.
Blades flat or folded, stiff; awn included or slightly exserted, straight.
Panicle open, usually nodding or drooping ..... 5. D. CAESPITOSA.
Panicle narrow, condensed, erect ..... 6. D. HOLCIFORMIS.

1. Deschampsia danthonioídes (Trin.) Munro. ANNUAL HAIRGRASS. (Fig. 568.) Annual; culms slender, erect, 15 to 60 cm tall; blades few, short, narrow; panicle open, 7 to 25 cm long, the capillary branches commonly in twos, stiffly ascending, naked below, bearing a few short-pediceled spikelets toward the ends; glumes 4 to 8 mm long, 3-nerved, acuminate, smooth except the keel, exceeding the florets; lemmas smooth and shining, somewhat indurate, 2 to 3 mm long, the base of the florets and the rachilla pilose, the awns geniculate, 4 to 6 mm long. ⊙ —Open ground, Alaska to Montana and Baja California; Texas (Buckley, but the locality possibly erroneous); also Chile (fig. 569). Variable in the size of the spikelets. A form described from southern California as *D. gracilis* Vasey, with somewhat laxer panicles, the rather more numerous spikelets only 4 to 5 mm long, grades into the usual form.

2. Deschampsia elongáta (Hook.) Munro. SLENDER HAIRGRASS. (Fig. 570.) Culms densely tufted, slender, erect, 30 to 120 cm tall; blades soft, 1 to 1.5 mm wide, flat or folded, those of the basal tuft filiform; panicle narrow, as much as 30 cm long, the capillary branches appressed; spikelets on short appressed pedicels; glumes 4 to 6 mm long, 3-nerved, equaling or slightly exceeding the florets; lemmas 2 to 3 mm long, similar to those of *D. danthonioides*, the awns shorter, straight. 2↓ —Open ground, Alaska to Wyoming, south to Arizona and California; Mexico (fig. 571); Chile.

3. Deschampsia atropurpúrea (Wahl.) Scheele. MOUNTAIN HAIRGRASS. (Fig. 572.) Culms loosely tufted, erect, purplish at base, 40 to 80 cm tall; blades flat, rather soft, ascending or appressed, 5 to 10 cm long, 4 to 6 mm wide, acute or abruptly acuminate;

panicle loose, open, 5 to 10 cm long, the few capillary drooping branches naked below; spikelets mostly purplish, broad; glumes about 5 mm long, broad, the second 3-nerved, exceeding the florets; lemmas scabrous, about 25 mm long, the callus hairs one-third to half as long, the awn of the first straight, included, of the second, geniculate, exserted. 2↓ —Woods and wet meadows, Newfoundland and Labrador to Alaska, south to the White Mountains of New Hampshire; Colorado, and Oregon (fig. 573); northern Eurasia.

FIGURE 568.—*Deschampsia danthonioides.* Panicle, × 1; glumes and floret, × 5. (Parish 3300, Calif.)

FIGURE 569.—Distribution of *Deschampsia danthonioides.*

4. Deschampsia flexuósa (L.) Trin. CRINKLED HAIRGRASS. (Fig. 574.) Culms densely tufted, erect, slender, 30 to 80 cm tall; leaves mostly in a basal tuft, numerous, the sheaths scabrous, the blades involute, slender or setaceous, flexuous; panicle loose, open, nodding, 5 to 12 cm long, the capillary branches naked below, the branchlets spikelet-bearing toward the ends; spikelets 4 to 5 mm long, purplish or bronze, the florets approximate; glumes 1-nerved, acute, shorter than the florets; lemmas scabrous, the callus hairs about 1 mm long, the awn attached near the base, geniculate, twisted, 5 to 7 mm long. 2↓ — Dry or rocky woods, slopes, and open ground, Greenland to Alaska, south to North Carolina, Michigan, and Wisconsin; Oklahoma (Le Flore County) (fig. 575); Eurasia. A form with yellow-striped foliage (called by gardeners *Aira foliis variegatis*) is occasionally grown for ornament.

FIGURE 570.—*Deschampsia elongata.* Panicle, × 1; glumes and floret, × 5. (Swallen 780, Calif.)

FIGURE 571.—Distribution of *Deschampsia elongata.*

5. Deschampsia caespitósa (L.) Beauv. TUFTED HAIRGRASS. (Fig. 576.) Culms in dense tufts, leafy at base, erect, 60 to 120 cm tall; sheaths smooth; blades 1.5 to 4 mm wide, often elongate, rather firm, flat or folded, scabrous above; panicle loose, open, nodding, 10 to 25 cm long, the capillary scabrous branches and branchlets spikelet-bearing toward the ends; spikelets 4 to 5 mm long, pale or purple-tinged, the florets distant, the rachilla joint half the length of the lower floret; glumes 1-nerved or the second obscurely 3-nerved, acute,

about as long as the florets; lemmas smooth, the callus hairs short; awn from near the base, from straight and included in the glumes to weakly geniculate and twice as long as the spikelet. 2↓ —Bogs and wet places, Greenland to Alaska, south to New Jersey, West Virginia, Illinois, North Dakota, New Mexico, and California (fig. 577); arctic and temperate regions of the Old World.

FIGURE 572.—*Deschampsia atropurpurea.* Panicle, × 1; glumes and floret, × 5. (Leiberg 2952, Idaho.)

FIGURE 573.—Distribution of *Deschampsia atropurpurea.*

Variable in size, in width and texture of blades, in shape of the panicle, and in length of awn. The forms which have been segregated as species are inconstant and the characters used to distinguish them are not correlated. Rarely with proliferous spikelets.

6. Deschampsia holcifórmis Presl. (Fig. 578.) Culms in dense tufts with numerous basal leaves, erect, relatively robust, 50 to 125 cm tall; blades mostly folded, as much as 50 cm long, 2 to 4 mm wide, rather firm; panicle 10 to 25 cm long, condensed, many-flowered, the branches appressed to subflexuous-ascending, purplish to brownish; spikelets 6 to 8 mm long; glumes and lemmas scaberulous, the glumes about equaling the spikelets or shorter, 3-nerved, the lateral nerves of the first often obscure; lemmas awned from below the middle, the awns erect, exceeding the spikelet, the callus hairs short. 2↓ —Marshes and sandy soil near the coast, Vancouver Island to central California.

FIGURE 575.—Distribution of *Deschampsia flexuosa.*

FIGURE 574.—*Deschampsia flexuósa.* Panicle, × 1; glumes and floret, × 5. (Hitchcock 16059, N. H.)

FIGURE 576.—*Deschampsia caespitosa*. Plant, × ½; glumes and floret, × 5. (Nelson 3623, Wyo.)

56. AÍRA L.

(*Aspris* Adans.)

Spikelets 2-flowered, disarticulating above the glumes, the rachilla not prolonged; glumes boatshaped, about equal, 1-nerved or obscurely 3-nerved, acute, membranaceous or subscarious; lemmas firm, rounded on the back, tapering into 2 slender teeth, bearing on the back below the middle a slender geniculate twisted usually exserted awn, this sometimes wanting in the lower floret or reduced; callus minutely bearded. Delicate annuals with lax, subfiliform blades and open or contracted panicles of small spikelets. Type species, *Aira praecox*. *Aira*, an old Greek name for a weed, probably darnel. Weedy grasses of no economic importance, introduced from Europe.

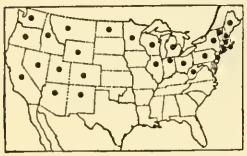

FIGURE 577.—Distribution of *Deschampsia caespitosa*.

FIGURE 578.—*Deschampsia holciformis*. Panicle, × 1; glumes and floret, × 5. (Bolander, Calif.)

FIGURE 579.—*Aira praecox*. Panicle, × 1; glumes and floret, × 5. (Amer. Gr. Nat. Herb. 375, Del.)

FIGURE 580.—Distribution of *Aira praecox*.

Panicle dense, spikelike ..... 1. A. PRAECOX.
Panicle open.
Lower floret with awn as long as that of the upper floret ..... 2. A. CARYOPHYLLEA.
Lower floret awnless or nearly so ..... 3. A. CAPILLARIS.

1. Aira praécox L. (Fig. 579.) Culms tufted, 10 to 20 cm tall, usually erect; panicle narrow, dense, 1 to 3 cm long; spikelets yellowish, shining, 3.5 to 4 mm long; lemmas with awns 2 to 4 mm long, that of the lower floret the shorter. ⊙ —Sandy open ground, along the coast, New Jersey to Virginia; Vancouver to California (fig. 580).

2. Aira caryophylléa L. SILVER HAIRGRASS. (Fig. 581.) Culms solitary or in small tufts, erect, 10 to 30 cm tall; panicle open, the silvery shining spikelets 3 mm long, clustered toward the ends of the

FIGURE 581.—*Aira caryophyllea*. Plant, × ½; spikelet and floret, × 10. (Heller 3889, Wash.)

spreading capillary branches; both lemmas with awns about 4 mm long. ⊙ —Open dry ground, Coastal Plain, Massachusetts to Florida and Louisiana; Ohio; common on the Pacific coast from British Columbia to California (fig. 582); southern South America.

3. Aira capillàris Host. (Fig. 583.) Resembling *A. caryophyllea;* panicle more diffuse; spikelets 2.5 mm long, scattered at the ends of the branches; lemma of lower floret awnless or with a minute awn just below the apex, that of the upper floret with an awn 3 mm long. ⊙ —Open ground, Coastal Plain, Maryland to Florida and Texas; Oregon and California, rare (fig. 584).

FIGURE 582.—Distribution of *Aira caryophyllea.*

Corynéphorus canéscens (L.) Beauv. Low, tufted annual resembling *Aira caryophyllea,* with pale contracted panicle; lemmas membranaceous, the awns jointed about the middle, the joint with a minute ring of hairs, the lower part straight, brown, the upper slender, club-shaped. ⊙ (*Weingaertneria canescens* Bernh.)—Ballast at Philadelphia and Camden, N. J., on Marthas Vineyard, and on Long Island; adventive from Europe.

FIGURE 583.—*Aira capillaris.* Panicle, × 1; spikelet and florets, × 5. (Davis 2016, S. C.)

57. AVÉNA L. Oats

Spikelets 2- to several-flowered, the rachilla bearded, disarticulating above the glumes and between the florets; glumes about equal, membranaceous or papery, mostly several-nerved, longer than the lower floret, usually exceeding the upper floret; lemmas indurate, except toward the summit, 5- to 9-nerved, bidentate at apex, bearing a dorsal bent and twisted awn (this straight and reduced in *Avena sativa*). Low or moderately tall annuals or perennials, with narrow or open, usually rather few-flowered panicles of usually large spikelets. Type species, *Avena sativa.* *Avena,* the old Latin name for oats.

The most important species of the genus is *A. sativa,* the familiar cultivated oat. Two other introduced species, *A. fatua* and *A. barbata,* are known as wild oats because of their close resemblance to the cultivated oat. These two species are common on the Pacific coast where they are weeds but are often utilized for hay. Much of the grain hay of that region is made from either cultivated or wild oats. The varieties of cultivated oat are derived from three species of *Avena.* The common varieties of this country and of temperate and mountain regions in general are derived from *A. fatua.* The Algerian oat grown in North Africa and Italy and the red oat of our Southern States

FIGURE 584.—Distribution of *Aira capillaris.*

(*A. byzantina* C. Koch) are derived from *A. sterilis*. A few varieties adapted to dry countries are derived from *A. barbata*. The two native species, found in the Rocky Mountain region, are of high palatability, but occur only scatteringly.

Plants annual.
- Teeth of lemma setaceous; pedicels curved, capillary ..... 3. A. BARBATA.
- Teeth of lemma acute, not setaceous; pedicels stouter.
  - Spikelets mostly 2-flowered, the florets not readily separating; awn usually straight or wanting; lemmas glabrous ..... 2. A. SATIVA.
  - Spikelets mostly 3-flowered, the florets readily separating; awn stout, geniculate, twisted; lemmas clothed with stiff brown hairs (hairs sometimes white or scant) ..... 1. A. FATUA.

Plants perennial.
- Blades involute; panicle 2 to 5 cm long ..... 6. A. MORTONIANA.
- Blades flat or folded; panicle 5 to 15 cm long.
  - Sheaths, at least the lower, and blades pubescent ..... 4. A. PUBESCENS.
  - Sheaths and blades glabrous ..... 5. A. HOOKERI.

SECTION 1. EUAVÉNA Griseb.

Annuals; spikelets pendulous, mostly more than 2 cm long. Introduced from Europe.

1. Avena fátua L. WILD OAT. (Fig. 585, *A.*) Culms 30 to 75 cm tall, erect, stout; leaves numerous, the blades flat, usually 4 to 8 mm wide, scabrous; panicle loose and open, the slender branches usually horizontally spreading; spikelets usually 3-flowered; glumes about 2.5 cm long; rachilla and lower part of the lemma clothed with long stiff brownish, or sometimes whitish, hairs, these sometimes scant; florets readily falling from the glumes; lemmas nerved above, about 2 cm long, the teeth acuminate, not setaceous; awn stout, geniculate, twisted below, 3 to 4 cm long. ⊙ —Cultivated soil and waste places; introduced from Europe; rare in the Eastern States; Maine to Pennsylvania, Missouri and westward, a common weed on the Pacific coast (fig. 586). Seed used for food by the Indians.

Avena stérilis L. ANIMATED OATS. Resembling *A. fatua*, the spikelets 3.5 to 4.5 cm long, the awns 5 to 7 cm long. ⊙ —Sometimes cultivated as a curiosity, occasionally spontaneous. When laid on a moist surface the fruits twist and untwist as the awns lose or absorb moisture.

2. Avena satíva L. OAT. (Fig. 585, *B.*) Differing from *A. fatua* in having mostly 2-flowered spikelets, the florets not readily separating from the glumes; lemmas glabrous; awn usually straight, often wanting. ⊙ —Commonly cultivated and occasionally escaped. In *A. nuda* L., NAKED OAT, the caryopsis readily separates from the lemma and palea. *A. brevis* Roth is a form with smaller spikelets, the lemmas plump, awned. *A. strigosa* Schreb. has a 1-sided panicle, the lemmas scabrous toward the apex, both florets awned.

3. Avena barbáta Brot. SLENDER OAT. (Fig. 587.) Differing from *A. fatua* in the somewhat smaller, mostly 2-flowered spikelets on curved capillary pedicels; lemmas clothed with stiff red hairs, the teeth ending in fine points 4 mm long. ⊙ —A common weed in fields and waste places, Washington, Oregon, to Arizona and California.

Cultivated oats fall into three groups according to the number of chromosomes. Group 1, 7 chromosomes, *A. brevis*, *A. strigosa*. Group 2, 14 chromosomes, *A. barbata*. Group 3, 21 chromosomes, *A.*

FIGURE 585.—*A*, *Avena fatua*. Plant, × ½; spikelet and floret, × 2. (Umbach. Ill.) *B*, *A. sativa*, × 2. (Deam, Ind.)

sativa, *A. fatua* (including *A. orientalis* Schreb.), *A. nuda*, *A. sterilis*, *A. byzantina* (including *A. sterilis* var. *algeriensis* Trabut).

SECTION 2. AVENÁSTRUM Koch

Perennials; spikelets upright, mostly less than 2 cm long.

4. Avena pubéscens Huds. (Fig. 588.) Culms erect, 50 to 80 cm tall; sheaths pubescent; blades flat, pubescent; panicle narrow, open, 10 to 15 cm long, the flexuous branches ascending; spikelets mostly 3-flowered, 12 to 15 mm long, glumes and lemmas thin, shining, the rachilla with long white hairs; first glume 1- or 3-nerved, the second 3-nerved; lemmas about 1 cm long; awn attached about the middle, 1.5 to 2 cm long. ♃ —Waste places, Connecticut and Vermont; introduced from Europe.

FIGURE 586.—Distribution of *Avena fatua*.

5. Avena hookéri Scribn. SPIKE OAT. (Fig. 589.) Culms densely tufted, 20 to 40 cm tall; blades firm, flat or folded, 1 to 3 mm wide, the margins somewhat thickened; panicle long-exserted, narrow, 5 to 10 cm long, the branches erect or ascending, 1-flowered, or the lower 2-flowered; spikelets 3- to 6-flowered, about 1.5 cm long; glumes very thin, slightly shorter than the spikelet; lemmas firm, brown, scaberulous, 1 to 1.2 cm long, the callus short-bearded, the rachilla joint white-villous; awn 1 to 1.5 cm long. ♃ —Dry slopes and prairies, Manitoba to Alberta, Montana, and New Mexico (fig. 590).

6. Avena mortoniána Scribn. ALPINE OAT. (Fig. 591.) Culms densely tufted, 10 to 20 cm tall; blades erect, firm, usually involute;

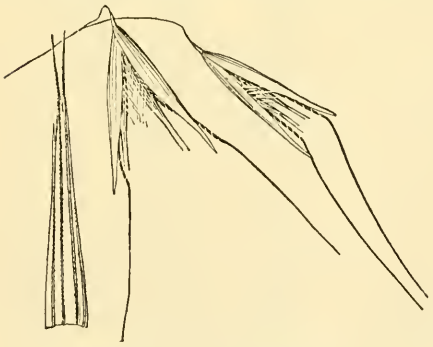

FIGURE 587.—*Avena barbata*. Spikelets, × 1; tip of lemma, × 5. (Davy 5023, Calif.)

FIGURE 588.—*Avena pubescens*. Glumes and floret, × 5. (Weatherby and Harger 4249, Conn.)

panicle short-exserted, purplish, narrow, 2 to 5 cm long, the short branches erect, bearing usually a single spikelet, 10 to 12 mm long, mostly 2-flowered; glumes exceeding the florets; lemmas firm, glabrous, the apex with 4 soft teeth, the callus with a tuft of stiff hairs about 2 mm long, the rachilla long-villous; awn 1 to 1.5 cm long. ♃ —Alpine meadows, Colorado, Utah, and New Mexico.

58. ARRHENÁTHERUM Beauv.

Spikelets 2-flowered, the lower floret staminate, the upper perfect, the rachilla disarticulating above the glumes and produced beyond the florets; glumes rather broad and papery, the first 1-nerved, the second a little longer than the first and about as long as the spikelet, 3-nerved; lemmas 5-nerved, hairy on the callus, the lower bearing near the base a twisted, geniculate, exserted awn, the upper bearing a short straight slender awn just below the tip. Rather tall perennials, with flat blades and narrow panicles. Type species, *Arrhenatherum avenaceum* Beauv. (*A. elatius*). Name from Greek *arren*, masculine, and *ather*, awn, referring to the awned staminate floret.

FIGURE 590.—Distribution of *Avena hookeri*.

FIGURE 589.—*Avena hookeri*. Panicle, ×1; floret, ×5. (Scribner 372, Mont.)

FIGURE 591.—*Avena mortoniana*. Panicle, ×1; floret, ×5. (Type.)

1. Arrhenatherum elátius (L.) Mert. and Koch. TALL OATGRASS. (Fig. 592, *A*.) Culms erect, 1 to 1.5 m tall; blades flat, scabrous, 5 to 10 mm wide; panicle pale or purplish, shining, 15 to 30 cm long, the short branches verticillate, spreading in anthesis, usually spikelet-bearing from the base; spikelets 7 to 8 mm long; glumes minutely scabrous; lemmas scabrous, the awn of the staminate floret about twice as long as its lemma. ♃ —Meadows, open ground, and waste places, Newfoundland to British Columbia, south to Georgia, Tennessee, Iowa, Idaho, and California; frequent in the Northern and Eastern States; introduced from Europe and escaped from cultivation. Cultivated in the northern humid regions as a meadow grass.

ARRHENATHERUM ELATIUS var. BULBÓSUM (Willd.) Spenner. TUBER OATGRASS. (Fig. 592, *B*.) Base of culm consisting of a series of closely approximate corms (shrot subglobose internodes) 5 to 10 mm in diameter. ♃ —Occasionally introduced, Michigan, Virginia to Alabama. Europe.

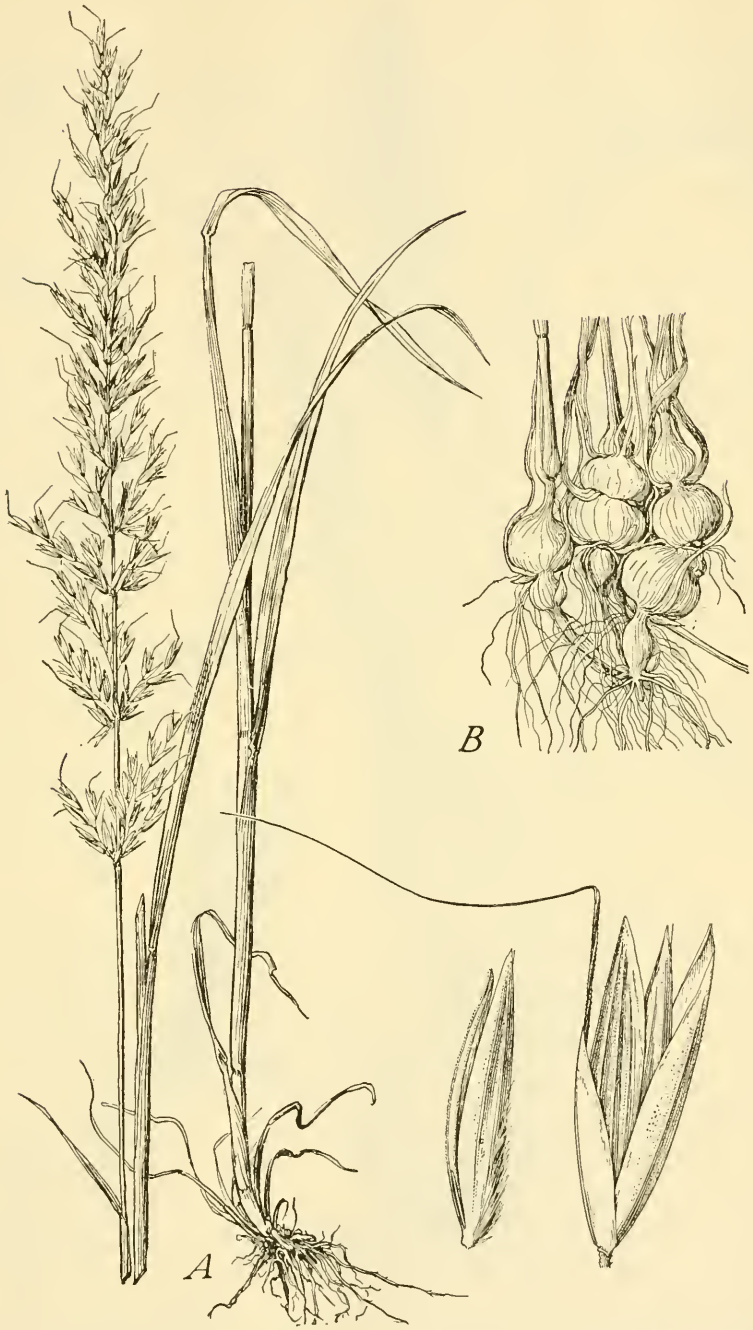

FIGURE 592.—*A*, *Arrhenatherum elatius*. Plant, × ½; spikelet and upper floret, × 5. (McDonald 46, Ill.)
B, Var. *bulbosum*. Basal corms, × 1. (Harper, Ala.)

FIGURE 593.—*A*, *Holcus lanatus*. Plant, × ½; spikelet, florets, and mature fertile floret, × 5. (Griffiths 4449, Calif.) *B*, *H. mollis*. Plant, × 1; glumes and florets, × 5. (Tracy 2646, Calif.)

59. HÓLCUS L.

(*Notholcus* Nash)

Spikelets 2-flowered, the pedicel disarticulating below the glumes, the rachilla curved and somewhat elongate below the first floret, not prolonged above the second floret; glumes about equal, longer than the 2 florets; first floret perfect, the lemma awnless; second floret staminate, the lemma bearing on the back a short awn. Perennials with flat blades and contracted panicles. Standard species, *Holcus lanatus*. *Holcus*, an old Latin name for a kind of grain.

Rhizomes wanting ..... 1. H. LANATUS.
Rhizomes present ..... 2. H. MOLLIS.

1. Holcus lanátus L. VELVET GRASS. (Fig. 593, *A*.) Plant grayish, velvety-pubescent; culms erect, 30 to 60 cm tall; blades 4 to 8 mm wide; panicles 8 to 15 cm long, contracted, pale, purple-tinged; spikelets 4 mm long; glumes villous, hirsute on the nerves, the second broader than the first, 3-nerved; lemmas smooth and shining, the awn of the second hooklike. 2l —Open ground, meadows, and moist places, Maine to Iowa, south to Georgia and Louisiana; common on the Pacific coast, British Columbia, and Idaho to Arizona and California (fig. 594); introduced from Europe; occasionally cultivated as a meadow grass on light or sandy land.

FIGURE 594.—Distribution of *Holcus lanatus*.

2. Holcus móllis L. (Fig. 593, *B*.) Culms glabrous, 50 to 100 cm tall, with vigorous slender rhizomes; sheaths, except the lower, glabrous; blades villous or velvety, 4 to 10 mm wide; panicle ovate or oblong, rather loose, 6 to 10 cm long; spikelets 4 to 5 mm long; glumes glabrous; awn of the second floret geniculate, exserted, about 3 mm long. 2l —Damp places, recently introduced from Europe and apparently spreading, Washington to California; Lewis County, N. Y.; ballast, Camden, N. J. (fig. 595).

60. DANTHÓNIA Lam. and DC. OATGRASS

Spikelets several-flowered, the rachilla readily disarticulating above the glumes and between the florets; glumes about equal, broad, papery, acute, mostly exceeding the uppermost floret; lemmas rounded on the back, obscurely several-nerved, the apex bifid, the lobes acute, usually extending into slender awns, a stout flat, twisted, geniculate awn arising from between the lobes. Tufted low or moderately tall perennials, with few-flowered open or spikelike panicles of rather large spikelets. All our species produce cleistogenes (enlarged fertile, 1- or 2-flowered, cleistogamous spikelets) in the lower sheaths, the culms finally disarticulating at the lower nodes.[7] Type species, *Danthonia spicata*. Named for Etienne Danthoine.

FIGURE 595.—Distribution of *Holcus mollis*.

The species are found in grassland and contribute somewhat toward the forage value of the range but usually are not abundant. In California *D. californica* is considered a nutritious grass; *D. compressa* is important in the mountains of North Carolina and Tennessee.

[7] CHASE, A. AXILLARY CLEISTOGENES IN SOME AMERICAN GRASSES. Amer. Journ. Bot. 5: 254. 1918.

FIGURE 596.—*A, Danthonia spicata.* Plant, × ½; spikelet, floret, and cleistogene, × 5. (Gayle 787, Maine.)
B, D. compressa. Panicle, × 1; floret, × 5. (Hitchcock 103, Tenn.)

Lemmas glabrous on the back, pilose on the margin only.
Panicle narrow, the pedicels appressed ---- 4. D. INTERMEDIA.
Panicle open, the slender pedicels spreading or reflexed.
Panicle usually of a single spikelet ---- 7. D. UNISPICATA.
Panicle of 2 to several spikelets ---- 6. D. CALIFORNICA.
Lemmas pilose on the back, sometimes sparsely so.
Glumes mostly 20 to 22 mm long ---- 5. D. PARRYI.
Glumes 10 to 17 mm long.
Sheaths pilose, (rarely glabrous); glumes 12 to 17 mm long. Culms 50 to 100 cm tall ---- 3. D. SERICEA.
Sheaths glabrous or nearly so; glumes rarely more than 15 mm long.
Panicle simple or nearly so, usually contracted after anthesis; blades rarely more than 15 cm long, commonly less ---- 1. D. SPICATA.
Panicle usually compound and somewhat open; blades or some of them more than 15 cm, often as much as 25 cm long ---- 2. D. COMPRESSA.

1. Danthonia spicáta (L.) Beauv. POVERTY OATGRASS. (Fig. 596, *A*.) Culms 20 to 70 cm tall, mostly not more than 50 cm, slender, terete; leaves numerous in a basal cluster, the blades usually curled or flexuous; sheaths glabrous or sparsely pilose, with a tuft of long hairs in the throat; blades usually not more than 12 cm long, filiform to 2 mm wide, occasionally a few blades 15 to 20 cm long, subinvolute or in damp weather flat, glabrous or sparsely pilose; panicle 2 to 5 cm long, rarely longer, the stiff short branches bearing a single spikelet, or the lower longer with 2 (rarely 3 or 4), usually erect after anthesis; glumes 10 to 12 mm long (rarely longer); lemmas 4 to 5 mm long, sparsely villous except the 2-toothed summit, the teeth acuminate to subsetaceous; terminal segment of awn about 5 mm long; palea broad, flat, obtuse, ciliolate, reaching to the base of the awn. 2l —Dry and sterile or rocky soil, Newfoundland to British Columbia, south to Florida, eastern Texas, and eastern Kansas, in the mountains to New Mexico and Oregon (fig. 597). Variable; tall specimens with longer blades and setaceous teeth resemble *D. compressa*. A rather stiff western form with subsetaceous teeth has been described as *D. thermale* Scribn.

FIGURE 597.—Distribution of *Danthonia spicata*.

FIGURE 598.—Distribution of *Danthonia compressa*.

2. Danthonia compréssa Austin. (Fig. 596, *B*.) Culms on the average stouter and taller than in *D. spicata*, compressed, rather loosely tufted, sometimes decumbent or with short rhizomes, 40 to 80 cm tall; sheaths reddish above the nodes, glabrous, or sparsely pubescent on the collar, a conspicuous tuft of white hairs in the throat; blades elongate, some of them commonly 20 to 25 cm long, 2 to 3 mm wide, usually flat, sometimes involute and subfiliform, scabrous; panicle 5 to 8 cm long (rarely to 10 cm), the slender branches bearing 2 or 3 spikelets, contracted after anthesis but looser than in *D. spicata;* glumes 10 to 14 mm (usually about 12 mm) long; lemma and palea as in *D. spicata* but the teeth of the lemma aristate, 2 to 3 mm long. 2l —Meadows, and open woods, Nova Scotia to Quebec, south to the mountains of North Carolina (fig 598). Appears to intergrade with *D. spicata*.

3. Danthonia sericea Nutt. DOWNY OATGRASS. (Fig. 599.) Culms erect, densely tufted, 50 to 100 cm tall; sheaths, especially the lower, villous (rarely glabrous); blades 10 to 25 cm long, 2 to 4 mm

wide, those of the innovations mostly involute, those of the culm mostly flat; panicle 5 to 10 cm long, relatively many-flowered, the branches bearing 2 to 6 spikelets, rather open or contracted after anthesis; glumes 12 to 17 mm long; lemmas densely long-pilose especially along the margin, about 10 mm long, including the slender aristate teeth, the teeth about half the entire length; palea concave, narrowed toward the 2-toothed apex. 2n —Sand barrens, chiefly Coastal Plain, Massachusetts (Sherborn); New Jersey to northern Florida, Tennessee, and Louisiana (fig. 600). A rare form with glabrous foliage has been called *D. epilis* Scribn. (*D. glabra* Nash, not Phil.) Virginia to Georgia.

FIGURE 599.—*Danthonia sericea*. Panicle, × 1; floret, × 5. (Kearney 1219, Va.)

4. Danthonia intermédia Vasey. TIMBER OATGRASS. (Fig. 601.) Culms 10 to 50 cm tall; sheaths glabrous (the lower rarely pilose) with long hairs in the throat; blades subinvolute, or those of the culm flat, glabrous or sparsely pilose; panicle purplish, narrow, few-flowered, 2 to 5 cm long, the branches appressed, bearing a single spikelet; glumes about 15 mm long; lemmas 7 to 8 mm long, appressed-pilose along the margin below and on the callus, the summit scaberulous, the teeth acuminate, aristate-tipped; terminal segment of awn 5 to 8 mm long; palea narrowed above, notched at the apex. 2n —Meadows and bogs, northern and alpine regions. Newfoundland and Quebec to Alaska, south to northern Michigan, New Mexico, and California (fig. 602).

FIGURE 600.—Distribution of *Danthonia sericea*.

FIGURE 601.—*Danthonia intermedia*. Panicle, × 1; floret, × 5. (Hitchcock 11288, Mont.)

5. Danthonia párryi Scribn. PARRY OATGRASS. (Fig. 603.) Culms rather stout, in tough clumps, 30 to 60 cm tall, somewhat enlarged at base from the numerous overlapping firm persistent sheaths; sheaths glabrous, somewhat pilose at the throat, a glabrous or pubescent line or ridge on the collar, the lower blades falling from the sheaths; blades erect-flexuous, mostly 15 to 25 cm long, narrow or filiform, flat or involute, glabrous; panicle 3 to 7 cm long, usually with 3 to 8 spikelets, the branches more or less pubescent, ascending or appressed, the lowermost 1 to 2 cm long, with 1 or 2 spikelets; glumes 20 to 22 mm long, rarely less; lemmas about 1 cm long, rather densely to sparsely pilose over the back, strongly pilose on the callus at the sides, the rachilla glabrous, the teeth more or less aristate;

FIGURE 602.—Distribution of *Danthonia intermedia*.

terminal segment of awn 8 to 12 mm long; palea narrowed above, nearly as long as the lemma, 2-toothed. ♃ —Open grassland, open woods, and rocky slopes, in the mountains, mostly below timber line, Alberta to New Mexico (fig. 604).

6. Danthonia californica Boland. CALIFORNIA OATGRASS. (Fig. 605.) Culms 30 to 80 cm tall, glabrous, tending to disarticulate at the nodes; sheaths glabrous, pilose at the throat; blades mostly 10 to 20 cm long, flat or, especially those of the innovations, involute, glabrous; panicle bearing mostly 2 to 5 spikelets, the pedicels slender, spreading or somewhat reflexed, more or less flexuous, 1 to 2 cm long, a rather prominent pulvinus at the base of each; glumes 15 to 20 mm long (rarely less or more); lemmas, excluding awns, 8 to 10 mm long, pilose on the lower part of the margin and on the callus, otherwise glabrous, the teeth long-aristate; terminal segment of awn 5 to 10 mm long; palea subacute, usually extending beyond base of awn. ♃ —Meadows and open woods, Montana to British Columbia, south to Colorado and California (fig. 606).

FIGURE 604.—Distribution of *Danthonia parryi*.

FIGURE 603.—*Danthonia parryi*. Panicle, × 1; floret, × 5. (Hitchcock 10987, Colo.)

FIGURE 605.—*Danthonia californica*. Panicle, × 1; floret, × 5. (Eastwood 27, Calif.)

FIGURE 606.—Distribution of *Danthonia californica*.

DANTHONIA CALIFORNICA var. AMERICÁNA (Scribn.) Hitchc. Culms on the average shorter, the tufts usually more spreading; foliage sparsely to conspicuously spreading-pilose; spikelets on the average smaller, but large plants with large spikelets occur, with conspicuously pilose foliage. ♃ —Montana and Wyoming to British Columbia, south to California; Chile. *D. macounii* Hitchc. appears to belong here, differing in

having lemmas sparsely pilose on the back. Known only from Nanaimo, Vancouver Island (*Macoun* 78825).

7. Danthonia unispicáta Munro. ONE-SPIKE OATGRASS. (Fig. 607.) Culms 15 to 25 cm tall, in dense spreading tufts; sheaths and blades pilose, the hairs on the sheaths spreading or reflexed; panicle reduced to a single spikelet or sometimes 2, rarely 3, spikelets, the lower spikelets usually reduced, their pedicels appressed or ascending, the long pedicel of the terminal spikelet jointed with the culm; spikelets on the average smaller than in *D. californica*. ♃ —Open or rocky ground, Montana to British Columbia, south to Wyoming and California (fig. 608).

TRIBE 5. AGROSTIDEAE

61. CALAMAGRÓSTIS Adans. REEDGRASS

Spikelets 1-flowered, the rachilla disarticulating above the glumes, prolonged behind the palea (in our species, except *Calamagrostis epigeios*) as a short, commonly hairy bristle; glumes about equal, acute or acuminate; lemma shorter and usually more delicate than the glumes, usually 5-nerved, the midnerve exserted as an awn, the callus bearing a tuft of hairs, these often copious and as long as the lemma. Perennial, usually moderately tall grasses, mostly with creeping rhizomes, with small spikelets in open or usually narrow, sometimes spikelike panicles. Type species, *Arundo calamagrostis* L. Name from Greek *kalamos*, a reed, and *agrostis*, a kind of grass, the type species being a reedy grass. Our species (except *C. epigeios*) belong to the Section Deyeuxia, in which the rachilla is prolonged. In Section Epigeios, of the Old World, the rachilla is not prolonged.

FIGURE 607.—*Danthonia unispicata*, × 5. (Davy, Calif.)

FIGURE 608.—Distribution of *Danthonia unispicata*.

Several species are important native forage grasses. Pinegrass, *C. rubescens*, is a leading range grass in the mountains of Oregon and Washington. Bluejoint, *C. canadensis*, is a source of much of the wild hay of Wisconsin and Minnesota. On the plains and bench lands of Wyoming and northward, *C. montanensis* furnishes forage, especially when young. In low wet lands of the Northern States *C. inexpansa* is grazed especially by horses and cattle.

1a. Awn longer than the glumes, geniculate.
2a. Panicle open, the branches spreading, naked below.
Blades scattered, 5 to 9 mm broad, flat. Plant mostly more than 1 m tall ..... 1. C. BOLANDERI.
Blades mostly basal, mostly not more than 2 mm wide, often involute.
Awn about 1 cm long, much longer than the glumes; blades nearly or quite as long as the flowering culms ..... 2. C. HOWELLII.
Awn only a little exceeding the glumes; blades much shorter than the culms, capillary, sulcate, folded ..... 3. C. BREWERI.
2b. Panicle compact, the branches appressed, floriferous from base.
Blades scattered, broad and flat, 6 to 10 mm wide ..... 4. C. TWEEDYI.
Blades mostly basal, firm, narrow, becoming involute.
Glumes about 1 cm long, gradually long-acuminate; awn nearly 1 cm long above the bend ..... 5. C. FOLIOSA.
Glumes 6 to 8 mm long, abruptly acute or acuminate; awn usually less than 5 mm above the bend ..... 6. C. PURPURASCENS.

1b. Awn included or scarcely longer than the glumes, straight or geniculate.
3a. Awn geniculate, protruding sidewise from the glumes; callus hairs rather sparse, shorter than the lemma. (See *C. cainii*, p. 993)
Blades narrow, soon involute; plants low, usually less than 30 cm tall, not tufted, rhizomatous. Panicle compact, spikelike_ 7. C. MONTANENSIS.
Blades flat, drying involute at tip; plants usually tall.
Sheaths pubescent on the collar.
Callus hairs about one-third as long as lemma; western species. 8. C. RUBESCENS.
Callus hairs half to three-fourths as long as lemma; eastern species.
Palea about as long as the lemma_____ 9. C. PORTERI.
Palea three-fourths as long as the lemma_____ 10. C. PERPLEXA.
Sheaths glabrous on the collar.
Panicle loose, the branches spreading or ascending. Plants 1 to 1.5 m tall; blades as much as 1 cm wide_____ 11. C. NUTKAENSIS.
Panicle compact.
Culms stout, mostly more than 1 m tall_____ 12. C. DENSA.
Culms more slender, mostly less than 1 m tall.
Spikelets 5 mm long; lemma as long as the glumes; panicle spikelike_____ 13. C. KOELERIOIDES.
Spikelets about 4 mm long; lemma shorter than the glumes; panicle scarcely spikelike, some of the branches naked below. 14. C. PICKERINGII.
3b. Awn straight (somewhat bent in *C. epigeios* and *C. lactea*), included; callus hairs usually not much shorter than the lemma.
Sheaths pubescent on the collar (see also *C. inexpansa* var. *barbulata*). 15. C. SCRIBNERI.
Sheaths glabrous on the collar.
Panicle rather loose and open.
Callus hairs copious, about as long as the lemma; awn delicate, straight_____ 16. C. CANADENSIS.
Callus hairs rather scant, about half as long as the lemma; awn stronger, weakly geniculate_____ 17. C. LACTEA.
Panicle more or less contracted.
Blades flat, rather lax.
Awn attached near the base; rachilla not prolonged. 23. C. EPIGEIOS.
Awn attached at or about middle; rachilla prolonged.
Glumes scabrous; plant green_____ 18. C. CINNOIDES.
Glumes nearly smooth; plant pale_____ 19. C. SCOPULORUM.
Blades involute or, if flat, rigid and becoming involute.
Blades broad and short, as much as 5 mm wide, nearly smooth. 22. C. CRASSIGLUMIS.
Blades elongate, smooth or scabrous.
Blades firm, scabrous, rather rigid; ligule 4 to 6 mm long; panicle firm_____ 20. C. INEXPANSA.
Blades rather lax, narrow; ligule 1 to 3 mm long; panicle rather soft_____ 21. C. NEGLECTA.

1. Calamagrostis bolandéri Thurb. (Fig. 609.) Culms erect, 1 to 1.5 m tall, with slender rhizomes; sheaths scabrous; ligule 4 to 5 mm long; blades flat, 5 to 9 mm wide, scattered, nearly smooth; panicle open, 10 to 20 cm long, the branches verticillate, spreading, naked below, the longer 5 to 10 cm long; glumes 3 to 4 mm long, purple, scabrous, acute; lemma very scabrous, about as long as the glumes, the awn from near the base, geniculate, exserted, about 2 mm long above the bend, the callus hairs short; rachilla pilose, 1 to 2 mm long. ♃ —Bogs and moist ground, prairie or open woods, near the coast, Mendocino and Humboldt Counties, Calif.

2. Calamagrostis howéllii Vasey. (Fig. 610.) Culms densely tufted, rather slender, ascending, 30 to 60 cm tall; sheaths smooth or slightly scabrous; ligule 2 to 8 mm long; blades slender, scabrous on the upper surface, flat or soon involute, especially toward the tip, about as long as the culms, the two cauline shorter, about 1 mm wide;

panicle pyramidal, 5 to 15 cm long, rather open, the lower branches in whorls, ascending, naked below, 3 to 5 cm long; spikelets pale or tinged with purple; glumes acuminate, 6 to 7 mm long; lemma acuminate, a little shorter than the glumes, the awn attached about 2 mm above the base, geniculate, exserted about 1 cm; callus hairs and those of the rachilla about half as long as the lemma. 2↓ —On perpendicular cliffs, vicinity of the Gap of the Columbia River.

3. Calamagrostis brewĕri Thurb. SHORTHAIR. (Fig. 611.) Culms densely tufted, slender, erect 15 to 30 cm tall; leaves mostly basal,

FIGURE 609.—*Calamagrostis bolanderi.* Panicle, × 1; glumes and floret, × 10. (Bolander, Calif.)

usually involute-filiform; panicle ovate, purple, 3 to 8 cm long, the lower branches slender, spreading, few-flowered, 1 to 2 cm long; glumes 3 to 4 mm long, smooth, acute; lemma nearly as long as glumes, cuspidate-toothed, the awn from near the base, geniculate, exserted, twisted below, about 2 mm long above the bend, the callus hairs short, scant; rachilla long-pilose, about half as long as the lemma. 2↓ —Mountain meadows of the high Sierra Nevada, Calif., where it is an important range grass.

4. Calamagrostis tweédyi (Scribn.) Scribn. (Fig. 612.) Culms erect, 1 to 1.5 m tall, smooth, with short rhizomes; sheaths smooth, the lower becoming fibrous; blades flat, somewhat scabrous, the cauline 5 to 15 cm long, as much as 1 cm wide, those of the innovations narrower and longer; panicle oblong, rather compact, or interrupted below, about 10 cm long; glumes abruptly acuminate, purple-tinged, 6 to 7 mm long; lemma about as long as the glumes, the awn exserted about 5 mm, the callus hairs scant, scarcely 1 mm long; rachilla

FIGURE 610.—*Calamagrostis howellii.* Panicle, × 1; glumes and floret, × 10. (Chase 4846, Oreg.)

pilose, 2 mm long. ♃ —Known only from the type locality, the "Cascade Mountains, Washington."

5. Calamagrostis foliósa Kearney. (Fig. 613.) Culms tufted, erect, 30 to 60 cm tall; leaves numerous crowded toward the base, the sheaths overlapping, the blades involute, firm, smooth, nearly as long as the culm; panicle pale, dense, spikelike, 5 to 12 cm long; glumes about 1 cm long, acuminate; lemma 5 to 7 mm long, acuminate, the apex with 4 setaceous teeth, the awn from near base, geniculate, about 8 mm long above the bend, the callus hairs numerous, 3 mm long; rachilla pilose, nearly as long as lemma. ♃ —Humboldt and Mendocino Counties, Calif.

FIGURE 611.—*Calamagrostis breweri.* Plant, × 1; glumes and floret, × 10. (Bolander 6098, Calif.)

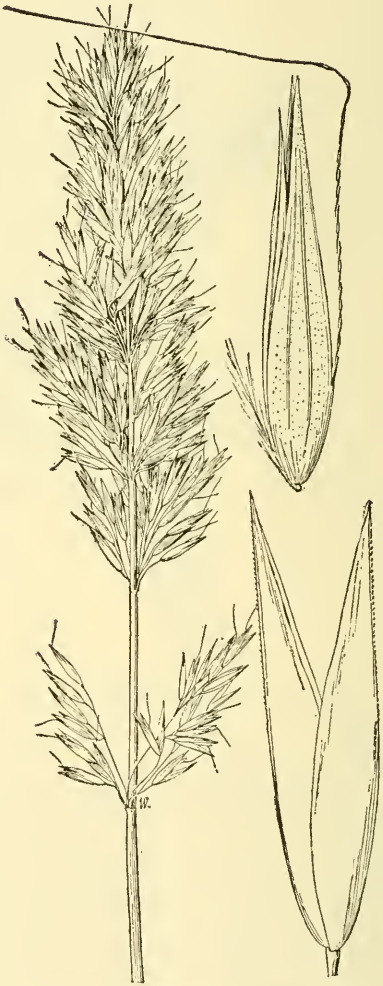

FIGURE 612.—*Calamagrostis tweedyi.* Panicle, × 1; glumes and floret, × 10. (Vasey, Wash.)

6. Calamagrostis purpuráscens R. Br. PURPLE REEDGRASS. (Fig. 614.) Culms tufted, sometimes with short rhizomes, erect, 40 to 60 cm or even 100 cm tall; sheaths usually scabrous, the old sheaths

FIGURE 613.—*Calamagrostis foliosa.* Panicle, × 1; glumes and floret, × 10. (Davy 6602, Calif.)

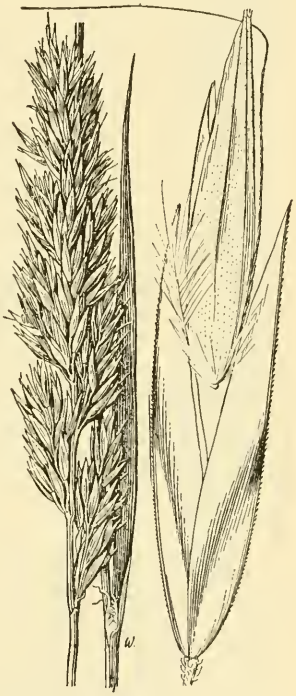

FIGURE 614.—*Calamagrostis purpurascens.* Panicle, × 1; glumes and floret, × 10. (Goodding 375, Wyo.)

persistent and fibrous; blades 2 to 4 mm wide, flat or more or less involute, rather thick, scabrous; panicle dense, usually pinkish or purplish, spikelike, 5 to 12 cm long, rarely longer; glumes 6 to 8 mm long, scabrous; lemma nearly as long as glumes, the apex with 4 setaceous teeth, the awn from near base, finally geniculate, exserted about 2 mm; hairs of callus and rachilla about one-third as long as the lemma. 2↓ (*C. vaseyi* Beal.)—Rocks and cliffs, Greenland to Alaska, south to Quebec, South Dakota (Black Hills), Colorado, and California (fig. 615).

FIGURE 615.—Distribution of *Calamagrostis purpurascens.*

7. Calamagrostis montanénsis Scribn. PLAINS REEDGRASS. (Fig. 616.) Culms stiffly erect, scabrous below the panicle, usually 20 to

40 cm tall, sometimes taller, with slender creeping rhizomes; lower sheaths rather papery, smooth; blades erect, mostly less than 2 mm wide, more or less involute, scabrous, sharp-pointed; panicle dense, erect, more or less interrupted, usually pale, 5 to 10 cm long; spikelets 4 to 5 mm long, the pedicels very scabrous; glumes acuminate, scabrous; lemma nearly as long as the glumes, finely 4-tootned, the awn attached about 1 mm above base, about equaling the lemma, slightly geniculate and protruding from side of glumes; palea nearly as long as the lemma; hairs of callus and rachilla rather abundant, about half as long as the lemma. 2l — Plains and dry open ground, Manitoba to Alberta, south to South Dakota, Wyoming, and Idaho (fig. 617).

FIGURE 617.—Distribution of *Calamagrostis montanensis.*

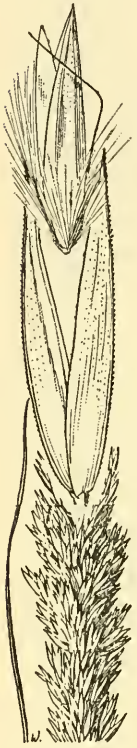

FIGURE 616.—*Calamagrostis montanensis.* Panicle, × 1; glumes and floret, × 10. (Scribner 363, Mont.)

8. Calamagrostis rubéscens Buckl. PINEGRASS. (Fig. 618.) Culms slender, tufted, 60 to 100 cm tall, with creeping rhizomes; sheaths smooth, but pubescent on the collar, sometimes obscurely so; blades erect, 2 to 4 mm wide, flat or somewhat involute, scabrous; panicle narrow, spikelike or somewhat loose or interrupted, pale or purple, 7 to 15 cm long; glumes 4 to 5 mm long, narrow, acuminate; lemma pale, thin, about as long as glumes, smooth, the nerves obscure, the awn from near base, geniculate, exserted from side of glumes, 1 to 2 mm long above the bend, the callus hairs scant, about one-third as long as the lemma; rachilla 1 mm long, the sparse hairs extending to 2 mm. 2l —Open pine woods, prairies, and banks, Manitoba to British Columbia, south to northern Colorado and central California (fig. 619). A valuable range grass. A large form with dense lobed panicle has been called *C. cusickii* Vasey.

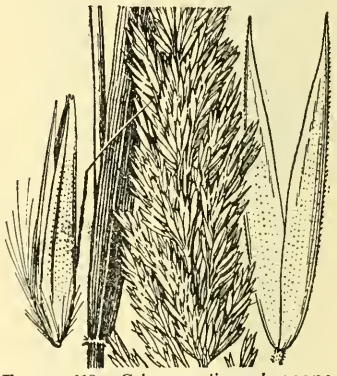

FIGURE 618.—*Calamagrostis rubescens.* Panicle, ×1; glumes and floret, ×10. (Sandberg and Leiberg, Wash.)

FIGURE 619.—Distribution of *Calamagrostis rubescens.*

9. Calamagrostis portéri A. Gray. (Fig. 620.) Culms slender, 60 to 120 cm tall, with slender rhizomes; sheaths pubescent on the collar; blades flat, spreading, lax, 4 to 8 mm wide; panicle narrow but rather loose, erect or somewhat nodding, 10 to 15 cm long; glumes 4 to 6 mm long, scaberulous; lemma slightly shorter than the glumes, toothed at apex, the awn from near base, about as long as the lemma, bent and protruding from side of glumes; palea about as long as the lemma; callus hairs

rather scant, nearly half as long as the lemma; rachilla hairs scant, extending to about 3 mm. 2l —Dry rocky soil, New York, Pennsylvania, Virginia (Luray), and West Virginia (fig. 621).

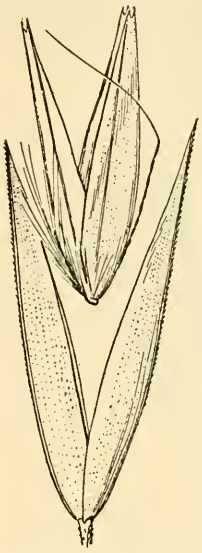

FIGURE 620.—*Calamagrostis porteri*, × 10. (Porter, Pa.)

10. Calamagrostis perpléxa Scribn. (Fig. 622.) Resembling *C. porteri*, differing in the somewhat larger, denser panicle and in the more copious callus hairs about three-fourths as long as the lemma, and in the more delicate awn. 2l —Wet rocks and sandy shores, Maine (Elliotsville), New Hampshire (White Mountains), New York (Thatcher's Pinnacle, near Ithaca, type locality), Ontario (Lake Nipagon), and Minnesota (Fond du Lac).

FIGURE 621.—Distribution of *Calamagrostis porteri*.

11. Calamagrostis nutkaénsis (Presl) Steud. (Fig. 623.) Culms stout, 1 to 1.5 m tall with short rhizomes (not usually present in herbarium specimens); ligule 6 to 8 mm long; blades elongate, 8 to 12 mm wide, flat becoming involute, gradually narrowed into a long point, scabrous; panicle usually purplish, narrow, rather loose, 15 to 30 cm long, the branches rather stiffly ascending; glumes 5 to 7 mm long, acuminate; lemma about 4 mm long, indistinctly nerved, the awn rather stout, from near the base, slightly geniculate, about equaling the lemma or shorter; hairs of callus and rachilla scarcely half as long. 2l —Along the coast in moist soil or wet wooded hills, from Alaska to central California.

12. Calamagrostis dénsa Vasey. CUYAMACA REED-GRASS. (Fig. 624.) Culms rather stout, densely tufted, smooth or scabrous just below the panicle, mostly more than 1 m tall, with rather stout rhizomes; sheaths slightly scabrous; ligule 3 to 5 mm long; blades flat, or subinvolute, scabrous, 15 to 25 cm long, 3 to 8 mm wide, the uppermost shorter; panicle spikelike, dense, pale, 10 to 15 cm long; glumes 4.5 to 5 mm long, acuminate, scaberulous; lemma 3.5 to 4 mm long, the awn bent, about as long as the lemma, more or less exserted at the side, the hairs of callus and rachilla scant,

FIGURE 622.—*Calamagrostis perplexa*. Glumes and floret, × 10. (Metcalf 5668, N. Y.)

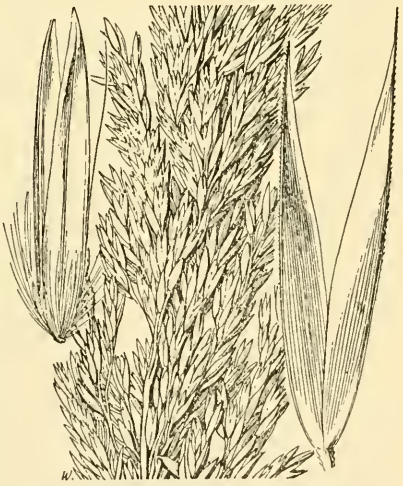

FIGURE 623.—*Calamagrostis nutkaensis*. Panicle, × 1; glumes and floret, × 10. (Hitchcock 23576, Oreg.)

about 1 mm long. 2↓ —Dry hills, among shrubs, mountains east of San Diego, Calif.

13. Calamagrostis koelerioídes Vasey. (Fig. 625.) Differs from *C. densa* in the more slender culms and (often purplish) panicles. 2↓ —Dry hills, banks, and meadows, Wyoming to Washington, south to southern California. (Fig. 626.) Probably a form of *C. densa.*

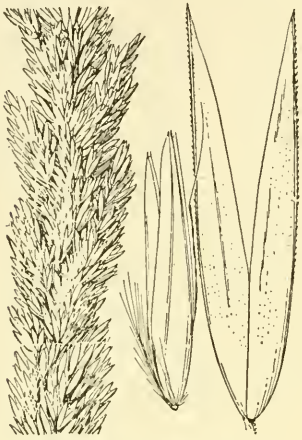

FIGURE 624.—*Calamagrostis densa.* Panicle, × 1; glumes and floret, × 10. (Hitchcock 13163, Calif.)

FIGURE 625.—*Calamagrostis koelerioides,* × 10. (Hitchcock 23558, Oreg.)

14. Calamagrostis pickeríngii A. Gray. (Fig. 627.) Culms solitary or few in tufts, rather rigid, scabrous below the panicle, 30 to 60 cm tall, with creeping rhizomes; blades erect, flat, 4 to 5 mm wide; panicle purplish, erect, contracted and rather dense, 7 to 12 cm long; glumes acute, about 4 to 4.5 mm long; lemma a little shorter than the glumes, scaberulous, narrowed to an obtuse point, the awn attached about 1 mm above the base, about as long as the lemma, slightly bent and protruding somewhat from the side of the glumes; callus hairs scant, about 0.5 mm long; rachilla about 1 mm long, the hairs short, rather scant. 2↓ —Bogs, wet meadows, and sandy beaches, Newfoundland and Labrador to the mountains of Massachusetts and NewYork; Isle Royal, Mich. (fig. 628). Slender plants with slightly smaller spikelets have been differentiated as *C. pickeringii* var. *debilis* (Kearney) Fern. and Wieg.

FIGURE 626.—Distribution of *Calamagrostis koelerioides.*

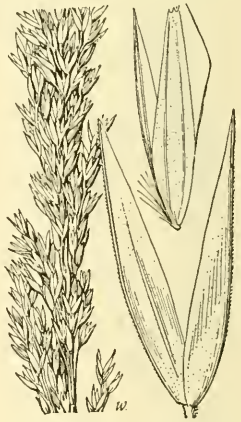

FIGURE 627.—*Calamagrostis pickeringii.* Panicle, × 1; glumes and floret, × 10. (Hubbard 634, Mass.)

15. Calamagrostis scribnéri Beal. SCRIBNER REEDGRASS. (Fig. 629.) Culms tufted, with numerous creeping rhizomes, slender, 60 to 100 cm tall; lower sheaths loose, thin, upper scabrous, retrorsely pubescent on the collar; ligule about 5 mm long; blades thin, elongate, 4 to 7 mm wide, scabrous; panicle pale or purplish, narrow but rather

lax, 10 to 15 cm long (rarely longer); glumes about 4 mm long, acuminate; lemma a little shorter than the glumes, sharply toothed, the awn about as long as the glumes or a little longer, feebly bent, the callus hairs about half as long as the lemma; rachilla minute, its hairs nearly as long as the lemma. 2¼ —Moist meadows, Montana and Washington to Colorado and Oregon; infrequent (fig. 630).

16. Calamagrostis canadénsis (Michx.) Beauv. Bluejoint. (Fig. 631, *A*.) Culms suberect, tufted, 60 to 150 cm tall, with numerous creeping rhizomes; sheaths glabrous or rarely obscurely pubescent; blades numerous, elongate, flat, rather lax, scabrous, 4 to 8 mm wide; panicle nodding, from narrow and rather dense to loose and relatively open, especially at base, 10 to 25 cm long; glumes usually 3 to 4 mm long, smooth or more commonly scabrous, acute to acuminate; lemma nearly as long as glumes, smooth, thin in texture, the awn delicate, straight, attached just below the middle and extending to or slightly beyond its tip, the callus hairs abundant, about as long as lemma; rachilla delicate, sparsely long-pilose. 2¼ —Marshes, wet places, open woods, and meadows, Greenland to Alaska, south to Maryland, North Carolina (Roan Mountain), Missouri, Kansas, Colorado, Arizona, and California (fig. 632). A widely distributed and exceedingly variable species. Characters used to differentiate the many proposed varieties are not correlated in the larger proportion of specimens. The panicle varies in density and the glumes in size and scabridity. The following varieties are recognizable but are connected with the species by many intergrading specimens.

Figure 628.—Distribution of *Calamagrostis pickeringii*.

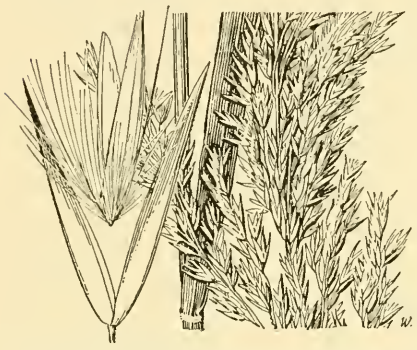

Figure 629.—*Calamagrostis scribneri*. Panicle, × 1; glumes and floret, × 10. (Rydberg 3083, Mont.)

Calamagrostis canadensis var. scábra (Presl) Hitchc. (Fig. 631, *B*.) Differing in having spikelets 4.5 to 6 mm long, the glumes rather firm, hispidly short-ciliate on the keel, strongly scabrous otherwise, but the greater scabridity not constant. 2¼ —Mountains of New England, New York, and northward, and along the Pacific coast from Washington to Alaska. This form has been referred to *C. langsdorfii* (Link) Trin., which proves to be an Old World species not found in America.

Figure 630.—Distribution of *Calamagrostis scribneri*.

Calamagrostis canadensis var. macouniána (Vasey) Stebbins. (Fig. 631, *C*.) Differing from *C. canadensis* in the smaller spikelets, about 2 mm long. Scarcely a distinct variety. 2¼ —Saskatchewan (*Macoun* 44, 45), Minnesota (Bemidge), South Dakota (Chamberlin, Redfield), Iowa, Nebraska (Central City), Missouri (Lake City, Little Blue), Montana (Manhattan), Yellowstone Park, Washington (Spokane County), Oregon (Crook County).

FIGURE 631.—*A*, *Calamagrostis canadensis*. Plant, × ½; glumes and floret, × 10. (Chase 5077, Mont.), *B*, Var. *scabra*, × 10. (Pringle, N. H.) *C*, Var. *macouniana*, × 10. (Pammel 891, Minn.)

17. Calamagrostis láctea Beal. (Fig. 633.) Culms ascending, 80 to 150 cm tall, weak, the nodes subgeniculate, with a short knotty rhizome; sheaths scaberulous; ligule rather firm, 3 to 5 mm long; blades elongate, flat, lax, scabrous, 6 to 12 mm wide; panicle pale, narrowly pyramidal, 12 to 20 cm long, loosely flowered; glumes 5 to 6 mm long, scabrous, acuminate; lemma shorter than the glumes, scabrous, the apex setaceous-toothed, the awn attached near the base, about equaling the lemma, weakly geniculate; palea slightly

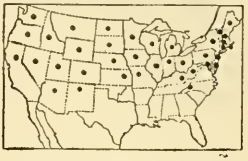

FIGURE 632.—Distribution of *Calamagrostis canadensis.*

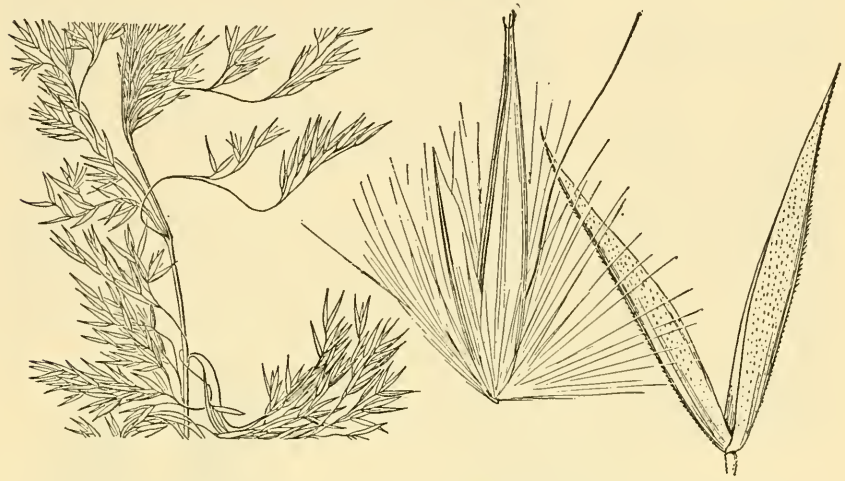

FIGURE 633.—*Calamagrostis lactea.* Panicle, × 1; glumes and floret, × 10. (Dupl. type.)

exceeding the lemma, the callus hairs about half as long; rachilla minute, sparsely pilose. 2|. —Mountain slopes, Washington and Oregon, apparently rare.

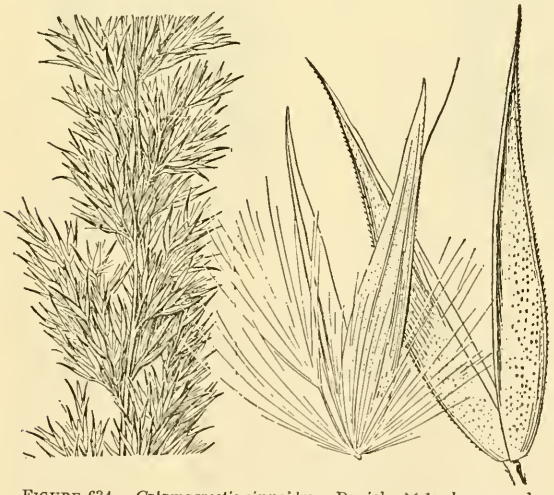

FIGURE 634.—*Calamagrostis cinnoides.* Panicle, × 1; glumes and floret, × 10. (Chase 7518, Md.)

18. Calamagrostis cinnoídes (Muhl.) Barton. (Fig. 634.) Glaucous; culms rather stout, erect, 80 to 150 cm tall, with slender rhizomes readily broken off; sheaths and blades very scabrous, sometimes sparsely hirsute, the blades flat, 5 to 10 mm wide; panicle erect, dense, more or less lobed (somewhat open at anthesis), 8 to 20 cm long, purple-tinged; glumes 6 to 7 mm long, scabrous, long-acuminate

or awn-pointed; lemma firm, acuminate, scabrous, shorter than the glumes, the awn attached about one fourth below the tip, not much exceeding the lemma, the callus hairs copious, about two-thirds as long; rachilla about 1 mm long, glabrous below, with a brush of long white hairs at the tip about equaling the lemma. ♃ —Bogs and moist ground, Maine to New York, south to Alabama (fig. 635).

FIGURE 635.—Distribution of *Calamagrostis cinnoides.*

19. Calamagrostis scopulórum Jones. (Fig. 636.) Pale, glaucous; culms erect, 50 to 80 cm tall, with short rhizomes; blades elongate, flat, scabrous, 3 to 7 mm wide; panicle pale to purplish, contracted, sometimes spikelike, 8 to 15 cm long; glumes 4 to 6 mm long, somewhat scabrous, acute or acuminate, not awn-pointed; lemma about as long as the glumes, minutely pilose, the awn attached above the middle, straight, about as long as the lemma, the callus hairs about two-thirds as long; rachilla rather sparsely long-pilose, especially on the upper part. ♃ —Moist soil in gulches, Wyoming (Wild Cat Peak), Colorado (Pagosa Peak), and Utah.

20. Calamagrostis inexpánsa A. Gray. NORTHERN REEDGRASS. (Fig. 637.) Culms tufted, 40 to 120 cm tall, with rather slender rhizomes, often scabrous below the panicle; sheaths smooth, or somewhat scabrous, the basal ones numerous, withering but persistent; ligule 4 to 6 mm long; blades firm, rather rigid, flat or loosely involute, very scabrous, 2 to 4 mm wide; panicle narrow, dense, the branches mostly erect and spikelet-bearing from the base; 5 to 15 cm long; glumes 3 to 4 mm long, abruptly acuminate, scaberulous; lemma as long as glumes, scabrous, the awn attached about the middle, straight or nearly so, about as long as glumes, the callus hairs half to three-fourths as long; rachilla 0.5 mm long, some of the hairs reaching to tip of lemma. ♃ —Meadows, marshes, and wet places, Greenland to Alaska, south to Maine, New York, Illinois, Missouri, Nebraska, New Mexico, and California (fig. 638). CALAMAGROSTIS INEXPANSA var. NOVAE-ÁNGLIAE Stebbins. Panicle more loosely flowered, the longer branches naked below. ♃ —Wet granite ledges, Maine to Vermont. CALAMAGROSTIS INEXPANSA var. BARBULÁTA Kearney. Culms robust, puberulent below the nodes; collar of sheaths puberulent; awn minute or obsolete, callus hairs nearly as long as the lemma. ♃ —Known only from Mason County, Wash.

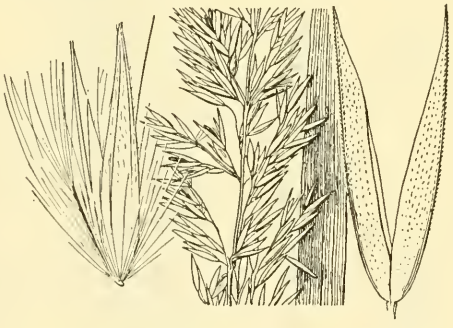

FIGURE 636.—*Calamagrostis scopulorum.* Panicle, × 1; glumes and floret, × 10. (Jones 1145, Utah.)

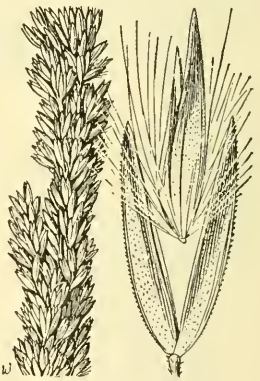

FIGURE 637.—*Calamagrostis inexpansa.* Panicle, × 1; glumes and floret, × 10. (Ehlers 566, Mich.)

CALAMAGROSTIS CALIFÓRNICA Kearney. (Fig. 639.) Resembling *C. inexpansa* but panicles longer and somewhat looser and callus hairs shorter. 2l —Known only from the type specimen, "Sierra Nevada." The status of this form is doubtful.

21. Calamagrostis neglécta (Ehrh.) Gaertn. Mey. and Schreb. (Fig. 640.) Resembling *C. inexpansa*, on the average smaller; ligule 1 to 3 mm long; blades smooth or nearly so, lax and soft, narrow, often filiform; panicles on the average smaller; glumes rather thinner in texture, often smooth. 2l —Marshes, sandy shores, and wet places, Greenland to Alaska, south to Maine, Vermont, New York, Michigan, Wisconsin, Colorado, Utah, and Oregon (fig. 641); northern Eurasia.

FIGURE 638.—Distribution of *Calamagrostis inexpansa.*

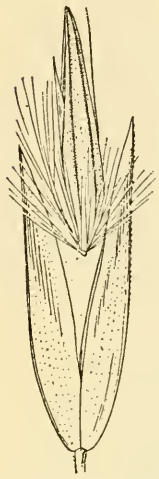

FIGURE 639.—*Calamagrostis californica*, ×10. (Type.)

22. Calamagrostis crassiglúmis Thurb. (Fig. 642.) Culms rather rigid, 15 to 40 cm tall, with short rhizomes; lower sheaths overlapping, somewhat papery; blades flat, or somewhat involute, smooth, firm, about 4 to 5 mm wide; panicle narrow, dense, spikelike, 2 to 5 cm long, dull purple; glumes 3 to 4 mm long, ovate, rather abruptly acuminate, purple, scaberulous, firm or almost indurate; lemma about as long as glumes, broad, obtuse or abruptly pointed, the awn attached about the middle, straight, about as long as lemma, the callus hairs abundant, about 3 mm long; rachilla 1 mm long, the hairs reaching to apex of lemma. 2l —Swampy soil, Vancouver Island, Washington (Whatcom Lake), California (Mendocino County). A rare species allied to *C. inexpansa* and *C. neglecta.*

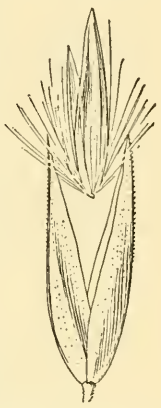

FIGURE 640.—*Calamagrostis neglecta*, ×10. (Fernald 182, Maine.)

23. Calamagrostis epigeíos (L.) Roth. (Fig. 643.) Culms slender, 1 to 1.5 m tall, with creeping rhizomes; ligule about 4 mm long, rather firm; blades elongate, mostly 4 to 5 mm wide, flat, scabrous; panicle pale, erect, narrow, rather dense, 25 to 30 cm long, narrowed at the summit; glumes subequal, 4 to 5 mm long, narrowly lanceolate-attenuate; lemma 2 to 2.3 mm long, strongly 2-toothed at the opaque apex, the awn from a little below the middle, about as long as the glumes, somewhat bent at the middle; callus hairs rather copious, about as long as the glumes; rachilla obsolete. 2l —(*C. arenicola* Fernald.) —Sandy woods in dense colonies, Harwich, Mass.; said to be established also at Gloucester, Mass., and Montgomery County, Pa.; Eurasia.

FIGURE 641.—Distribution of *Calamagrostis neglecta.*

62. AMMÓPHILA Host. BEACHGRASS

Spikelets 1-flowered, compressed, the rachilla disarticulating above the glumes, produced beyond the palea as a short bristle, hairy above; glumes about equal, chartaceous; lemma similar to and a

little shorter than the glumes, the callus bearded; palea nearly as long as the lemma. Tough, rather coarse, erect perennials, with hard, scaly, creeping rhizomes, long, tough, involute blades, and pale, dense spikelike panicles. Type species, *Ammophila arenaria.* Named from the Greek *ammos*, sand, and *philos*, loving, alluding to the habitat.

FIGURE 642.—*Calamagrostis crassiglumis.* Panicle, × 1; glumes and floret, × 10. (Suksdorf 1024, Wash.)

The species of *Ammophila* are important sand-binding grasses, *A. arenaria* being used in northern Europe to hold the barrier dunes along the coast. In this country it has been tried with success on Cape Cod and at Golden Gate Park, San Francisco. Called also marram, psamma, and sea sandreed.

Ligule thin, 10 to 30 mm long_____1. A. ARENARIA.
Ligule firm, 1 to 3 mm long__ 2. A. BREVILIGULATA.

1. Ammophila arenária (L.) Link. EUROPEAN BEACHGRASS. (Fig. 644, *B.*) Culms 50 to 150 cm tall, with deep extensively creeping rhizomes; ligule thin, 1 to 3 cm long, blades elongate, firm, soon involute, tapering to a fine point, the upper surface puberulent; panicle 10 to 20 cm long; spikelets 1.2 to 1.5 cm long; glumes glabrous, scabrous on the keels, the first 1-nerved, the second 3-nerved; lemma scabrous, the callus hairs about 3 mm long, the rachilla about 2 mm long. 2↓ —Sand dunes along the coast from San Francisco to Oregon; introduced as a sand binder in the vicinity of San Francisco and now established at several places to the north; coast of Europe.

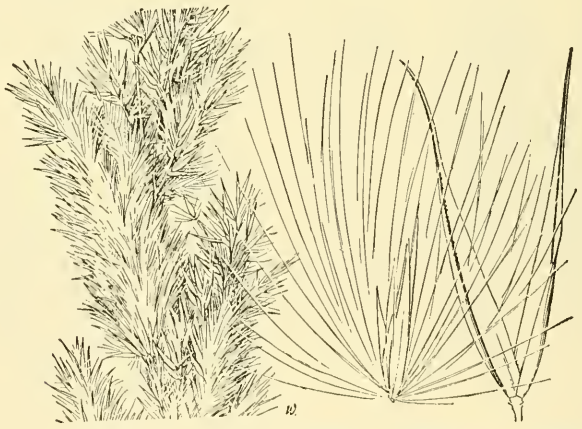

FIGURE 643.—*Calamagrostis epigeios.* Panicle, × 1; glumes and floret, × 10. (Fernald 757, Mass.)

2. Ammophila breviligulàta Fernald. AMERICAN BEACHGRASS. (Fig. 644, *A.*) Similar to *A. arenaria;* ligule firm, 1 to 3 mm long; blades scaberulous on the upper surface; callus hairs shorter. 2↓ —Sand dunes along the coast from Newfoundland to North Carolina, and on the shores of the Great Lakes from Lake Ontario to Lake Superior and Lake Michigan (fig. 645).

FIGURE 644.—*A*, *Ammophila breviligulata*. Plant, × ½; spikelet and floret, × 5. (Sherff, Ind.) *B*, *Ammophila arenaria*. Glumes, floret, and ligule, × 5. (Heller 5670, Calif.)

63. CALAMOVÍLFA Hack.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, not prolonged behind the palea; glumes unequal, chartaceous, 1-nerved, acute; lemma a little longer than the second glume, chartaceous, 1-nerved, awnless, glabrous or pubescent, the callus bearded; palea about as long as the lemma. Rigid, usually tall perennials, with narrow or open panicles, some species with creeping rhizomes. Type species, *Calamovilfa brevipilis*. Name from Greek *kalamos*, reed, and *Vilfa* a genus of grasses. *Calamovilfa longifolia* is of some value for forage but is rather coarse and woody; a variety of this and also *C. gigantea* are inland sand binders.

Rhizomes short and thick.
- Panicle narrow, contracted ..... 1. C. CURTISSII.
- Panicle subpyramidal, rather open ..... 2. C. BREVIPILIS.

Rhizomes extensively creeping.
- Lemma glabrous (except for the callus hairs) ..... 3. C. LONGIFOLIA.
- Lemma villous on the back above the callus hairs ..... 4. C. GIGANTEA.

1. Calamovilfa curtíssii (Vasey) Scribn. (Fig. 646.) Culms tufted from a short, thick horizontal rhizome, about 1 m tall; lower sheaths firm, overlapping, persistent; blades elongate, 2 to 3 mm wide, flat to involute, those of the innovations subfiliform; panicle contracted but not dense, 15 to 20 cm long; spikelets pale, about 5 mm long; glumes acute, the first 4 mm, the second 5 mm long; lemma as long as the second glume, acute, villous on the back below, the callus hairs 1 to 1.5 mm long; palea sparsely villous along the keels. ♃ —Low pine barrens, East Florida; also Santa Rosa County, Fla.

FIGURE 645.—Distribution of *Ammophila breviligulata*.

2. Calamovilfa brevípilis (Torr.) Scribn. (Fig. 647.) Culms solitary or few, compressed, 60 to 120 cm tall, the base as in *C. curtissii;* blades elongate, 2 to 3 mm wide, flat to subinvolute; panicle subpyramidal, rather open, 10 to 25 cm long, the branches ascending, flexuous, glabrous, naked below; spikelets brownish, 5 to 6 mm long; glumes acuminate, the first 2 to 2.5 mm long, the second about 4 mm long; lemma villous on the back below, the callus hairs 1.5 mm long; palea exceeding the lemma, villous on the back. ♃ — Marshes and river banks, New Jersey, North Carolina, rare.

3. Calamovilfa longifólia (Hook.) Scribn. (Fig. 648.) Culms mostly solitary, 50 to 180 cm tall, with strong scaly creeping rhizomes; sheaths usually more or less appressed-villous, especially near the summit; blades firm, elongate, flat or soon involute, 4 to 8 mm wide near base, tapering to a long fine point; panicle 15 to 35 cm long, rather narrow or contracted, the branches ascending or appressed, sometimes slightly spreading; spikelets pale, 6 to 7 mm long; glumes acuminate, the first about 2 mm shorter than the second; lemma somewhat shorter than the second glume, glabrous, the callus hairs copious, more than half as long as the lemma. ♃ —Sand hills and sandy prairies or open woods, Michigan to Alberta, south to Indiana, Colorado, and Idaho (fig. 649). CALAMOVILFA LONGIFOLIA var. MÁGNA Scribn. and Merr. Panicle more open and spreading. ♃ —Sandy ridges and dunes along Lake Huron and Lake Michigan.

4. Calamovilfa gigantéa (Nutt.) Scribn. and Merr. (Fig. 650.) Culms robust, mostly solitary, usually 1.5 to 2 m tall, as much as 6 mm thick at base, with strong creeping rhizomes; sheaths glabrous; blades elongate, 5 to 10 mm wide at base, tapering to a long involute tip; panicle open, as much as 60 cm long, the branches rather stiffly spreading, as much as 25 cm long; spikelets similar to those of *C. longifolia*, but somewhat larger; lemma and palea villous along the back; callus hairs copious, half as long as the lemma. ♃ —Sand dunes, North Dakota to Texas and west to Arizona (fig. 651).

FIGURE 646.—*Calamovilfa curtissii*. Plant, × ½; glumes and floret, × 5. (Garber, Fla.)

64. AGRÓSTIS L. BENTGRASS

Spikelets 1-flowered, disarticulating above the glumes, the rachilla usually not prolonged; glumes equal or nearly so, acute, acuminate, or sometimes awn-pointed, usually scabrous on the keel and sometimes on the back; lemma obtuse, usually shorter and thinner than the glumes, awnless or dorsally awned, often hairy on the callus; palea usually shorter than the lemma, 2-nerved in only a few species, usually small and nerveless or obsolete. Delicate to moderately tall annuals or usually perennials, with flat or sometimes involute, scabrous blades, and open to contracted panicles of small spikelets. Type

FIGURE 647.—*Calamovilfa brevipilis*. Plant, × ½; glumes and floret, × 5. (Brinton, N. J.)

species, *Agrostis stolonifera*. Name from Greek *agrostis*, a kind of grass, from *agros*, a field; the word agrostology is from the same root.

FIGURE 648.—*Calamovilfa longifolia.* Plant, × ½; spikelet and floret, × 5. (Babcock, Ill.)

The rachilla is regularly prolonged in a few species and in occasional spikelets of other species.

Most of the species are important forage plants, either under cultivation or in the mountain meadows of the Western States. The three important cultivated species are redtop, *Agrostis alba*, used for meadows, pastures, lawns, and sports turf, Colonial bent, *A. tenuis*, used for pastures, lawns, and sports turf, and creeping bent, *A. palustris*, used for lawns and golf greens. Velvet bent, *A. canina*, is sometimes

FIGURE 649.—Distribution of *Calamovilfa longifolia*.

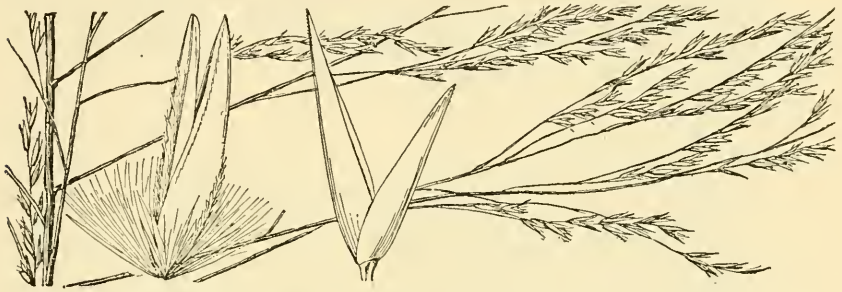

FIGURE 650.—*Calamovilfa gigantea*. Panicle, × ½; glumes and floret, × 5. (White, Okla.)

used for putting greens. Recently forms of *A. palustris* called Washington bent and Metropolitan bent, have come into use for lawns and especially for golf greens. They are propagated by the stolons. Fiorin is a name applied in England to *A. palustris*.

FIGURE 651.—Distribution of *Calamovilfa gigantea*.

The native species abundant enough to be of importance as forage plants are *A. exarata*, throughout the western half of the United States, *A. oregonensis* in Oregon, and *A. rossae* in alpine regions of the Northwest.

1a. Palea evident, 2-nerved, at least half as long as the lemma.
2a. Rachilla prolonged behind the palea as a minute bristle.
Lemma pubescent ..... 1. A. RETROFRACTA.
Lemma glabrous.
Lemma awned; plants annual.
Panicle open, the branches naked below ..... 2. A. SPICA-VENTI.
Panicle narrow, contracted, interrupted, the branches, or some of them floriferous from the base ..... 3. A. INTERRUPTA.
Lemma awnless; plants perennial.
Spikelets 2 mm long ..... 4. A. THURBERIANA.
Spikelets 3 mm long ..... 5. A. AEQUIVALVIS.
2b. Rachilla not prolonged.
Glumes scabrous on the keel and on the back; panicle contracted, lobed, the short branches densely verticillate ..... 6. A. VERTICILLATA.
Glumes scabrous on the keel only; panicle open or, if contracted, not lobed nor with densely verticillate branches.
Plants tufted; dwarf alpine species ..... 12. A. HUMILIS.
Plants with rhizomes or stolons; taller species of low and medium altitudes.
Branches of panicle naked at base, the panicle open and delicate; ligule as much as 2 mm long on culm leaves, less than 1 mm on the innovations ..... 11. A. TENUIS.
Branches of panicle or some of them floriferous from base; ligule as much as 6 mm long.
Panicle contracted, the branches appressed; long stolons developed in isolated plants. Culms decumbent at base. 8. A. PALUSTRIS.

Panicle open, the branches ascending, no long stolons developed.
Culms producing rather stout creeping leafy stolons. 9. A. NIGRA.
Culms decumbent at base; rhizomes wanting. 7. A. STOLONIFERA.
Culms erect; rhizomes present---------- 10. A. ALBA.
1b. Palea obsolete, or a minute nerveless scale (in *A. exarata* and *A. californica* as much as 0.5 mm long or more).
3a. Plants annual; lemma with a slender awn 5 to 10 mm long.
Awn flexuous; Southeastern States---------- 15. A. ELLIOTTIANA.
Awn straight; Pacific coast.
Spikelets 5 to 6 mm long; lemma awned from the middle----------
13. A. HENDERSONII.
Spikelets about 1.5 mm long; lemma awned below the tip----------
14. A. EXIGUA.
3b. Plants perennial; lemma awned or awnless, the awn when present not much exserted.
4a. Plants spreading by creeping rhizomes (those of *A. lepida* short).
Hairs at base of lemma 1 to 2 mm long---------- 16. A. HALLII.
Hairs at base of lemma minute or wanting.
Rhizomes short; alpine tufted plants---------- 17. A. LEPIDA.
Rhizomes long and slender.
Panicle spikelike---------- 18. A. PALLENS.
Panicle open---------- 19. A. DIEGOENSIS.
4b. Plants without rhizomes, stolons sometimes developed.
5a. Panicle narrow, contracted, at least some of the lower branches spikelet-bearing from near the base.
Culms slender, in dense tufts with numerous basal leaves; blades not more than 5 cm long, less than 2 mm wide; panicles seldom more than 5 mm wide.
Blades involute; culms spreading; panicles strict--- 20. A. BLASDALEI.
Blades flat; culms erect; panicles not strict-------- 21. A. ROSSAE.
Culms stouter, not in tufts with dense basal foliage; blades or some of them at least 8 to 10 cm long and 4 to 5 mm wide, commonly much larger.
Panicle from loose to dense, if dense, in glomerules or interrupted; glumes, except the keel, smooth to scaberulous; palea less than one fourth as long as the lemma---------- 22. A. EXARATA.
Panicle dense and spikelike; glumes very scabrous; palea one fourth to one third as long as the lemma-------- 23. A. CALIFORNICA.
5b. Panicle open, sometimes diffusely spreading; lower branches not spikelet-bearing at the base.
Awn attached near the base of the lemma; panicle diffuse.
24. A. HOWELLII.
Awn when present attached about the middle of the lemma or above.
Panicles very diffuse, the scabrous capillary branches branching toward the end or (in *A. hiemalis* var. *geminata*) above the middle.
25. A. HIEMALIS.
Panicles open but not diffuse, the branches branching at or below the middle.
Lemmas awnless (occasional plants with awned lemmas; see also *A. bakeri*).
Spikelets about 1.5 mm long; plants of high altitudes, delicate, 10 to 30 cm tall---------- 26. A. IDAHOENSIS.
Spikelets 2 to 3 mm long; more robust plants of low and medium altitudes.
Panicles rather lax, sometimes delicate and divaricately spreading; blades flat, as much as 6 mm wide; eastern United States---------- 28. A. PERENNANS.
Panicles rather stiff, the branches whorled and rather stiffly ascending; Pacific coast---------- 29. A. OREGONENSIS.
Lemmas awned.
Spikelets about 2 mm long; introduced------ 30. A. CANINA.
Spikelets 2.5 to 3 mm long; native.
Branches of panicle nearly smooth. Foliage mostly basal.
31. A. BOREALIS.
Branches of panicle scabrous.
Awn short and straight---------- 27. A. BAKERI.
Awn geniculate, exserted---------- 32. A. LONGILIGULA.

1. Agrostis retrofrácta Willd. (Fig. 652.) Perennial; culms tufted, erect or decumbent at base, 20 to 60 cm tall; sheaths smooth; ligule of culm leaves 3 to 5 mm long; blades flat, scabrous, 1 to 2 mm wide; panicle diffuse, 15 to 30 cm long, the branches in distant whorls, capillary, reflexed at maturity, divided above the middle; glumes acuminate, 3 to 4 mm long; lemma about half as long as the glumes, thin, pubescent, short-bearded on the callus, and bearing about the middle a slender geniculate and twisted awn exserted about the length of the glumes; palea nearly as long as the lemma; rachilla slender, pilose, from half to as long as the lemma. 2l —Introduced in central California (15 miles south of Stockton), Texas (Kent), and Ohio (Painesville); common in Hawaiian Islands and Polynesia.

2. Agrostis spíca-vénti L. (Fig. 653, *A*.) Annual; culms branched at base, mostly 40 to 60 cm tall; ligule as much as 6 mm long; blades

FIGURE 652.—*Agrostis retrofracta*. Panicle, × ½; glumes and floret, × 10. (Tracy and Earle 403, Tex.)

flat, 1 to 3 mm wide; panicle 10 to 20 cm long, usually less than half as broad, the branches capillary, spreading, whorled, naked at base; spikelets 2 to 2.5 mm long; glumes somewhat unequal, the first shorter and narrower; lemma about as long as the second glume, scaberulous, with a slender awn from below the apex, the awn about twice as long as the glumes; palea about as long as the lemma; rachilla less than 0.5 mm long. ⊙ —Introduced at a few points from Maine to Maryland; Ohio; Portland, Oreg. (fig. 654); Europe.

3. Agrostis interrúpta L. (Fig. 653, *B*.) Similar to *A. spica-venti;* panicle narrower, more condensed, interrupted, the branches or some of them floriferous from the base; awn of lemma about 1 cm long ⊙ —Introduced in Missouri (St. Louis), Washington (Spokane), Oregon (Portland), Idaho (Nezperce Forest), and British Columbia (Okanogan); Europe.

4. Agrostis thurberiána Hitchc. THURBER REDTOP. (Fig. 655.) Culms slender, in small tufts, erect, 20 to 40 cm tall; leaves somewhat crowded at base, the blades about 2 mm wide; panicle rather narrow, lax, more or less drooping, 5 to 7 cm long; spikelets green, pale, or purple, 2 mm long; lemma nearly as long as the glumes, the palea about two thirds as long; rachilla hairy, 0.3 mm long. 2l —Bogs and moist places, at medium and upper altitudes, Colorado to British Columbia and south in the Sierras to central California (fig. 656).

FIGURE 653.—*A*, *Agrostis spica-venti*. Plant, × ½; glumes and floret, × 5. (Martindale, N. J.) *B*, *A. interrupta*. Panicle, × ½; glumes and floret, × 5. (Bonser 3, Wash.)

5. Agrostis aequivâlvis (Trin.) Trin. (Fig. 657.) Similar to *A. thurberiana;* culms on the average taller, blades longer; panicle usually purple, 5 to 15 cm long; spikelets about 3 to 4.5 mm long; palea nearly as long as the lemma; prolongation of the rachilla minutely pubescent, one fifth to half as long as the lemma. ♃ —Wet meadows and bogs, Alaska, southward (rare) in the Cascade Mountains to Oregon.

FIGURE 654.—Distribution of *Agrostis spica-venti.*

6. Agrostis verticillâta Vill. WATER BENT. (Fig. 658.) Culms usually decumbent at base, sometimes with long creeping and rooting stolons; blades firm, mostly relatively short and broad, but in luxuriant specimens elongate; panicle contracted, 3 to 10 cm long, densely flowered, lobed with short verticillate branches, especially at base, the branches spikelet-bearing from the base; spikelets usually falling entire; glumes equal, narrowed to an obtuse tip, scabrous on back and keel, 2 mm long; lemma 1 mm long, awnless, truncate and toothed at apex; palea nearly as long as the lemma. ♃ —Moist ground at low altitudes, especially along irrigation ditches (in irrigated regions), Texas to California, north to southern Utah and Washington; on ballast at some Atlantic ports. Introduced in America, south through the drier parts to Argentina (fig. 659); warmer parts of the Eastern Hemisphere.

FIGURE 655.—*Agrostis thurberiana.* Panicle, × 1; glumes and floret, × 5. (Type.)

FIGURE 656.—Distribution of *Agrostis thurberiana.*

7. Agrostis stolonífera L. (Fig. 660.) Culms ascending from a spreading base, the decumbent portion rooting in wet soil, 20 to 50 cm tall; ligule as much as 6 mm long; blades flat, mostly 1 to 3 mm wide; panicle oblong, 5 to 15 cm long, pale or purple, somewhat open, the branches or some of them spikelet-bearing from near the base; spikelets 2 to 2.5 mm long; glumes acute, glabrous except the scabrous keel; lemma shorter than the glumes, awnless or rarely awned from the back; palea usually half to two thirds as long as the lemma. ♃ —Moist grassy places, Newfoundland to Alaska, south to New Jersey in the East and to Oregon in the West (fig. 661); northern Europe. This species appears to be native in northern North America.

FIGURE 657.—*Agrostis aequivalvis.* Panicle, × 1; glumes and floret, × 5. (Howell 1712, Alaska.)

FIGURE 658.—*Agrostis verticillata.* Panicle, × 1; glumes and floret, × 5. (Schoenfeldt 3159, Calif.)

8. Agrostis palústris Huds. CREEPING BENT. (Fig. 662.) Differing from *A. stolonifera* chiefly in the long stolons, the narrow stiff appressed blades, and the condensed (sometimes somewhat open) panicle. 2↓ (*A. maritima* Lam.)—Marshes along the coast, from Newfoundland to Maryland; British Columbia to northern California; sometimes occupying extensive areas, as at Coos Bay, Oreg.; introduced at various places in the interior of southern Canada and northern United States and occasionally as far south as Texas and New Mexico, especially along ditches (fig. 663); Eurasia. Forms of this species, known as seaside, Coos Bay, and Cocoos bents (propagated by seed), and Metropolitan and Washington bents (propagated by stolons, and formerly called carpet bent), are used for lawns and extensively for putting greens.

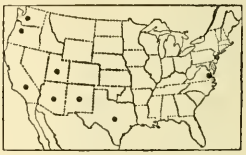

FIGURE 659.—Distribution of *Agrostis verticillata.*

FIGURE 661.—Distribution of *Agrostis stolonifera.*

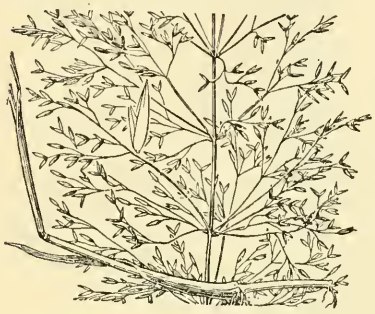

FIGURE 660.—*Agrostis stolonifera.* Panicle, × 1; floret, × 5. (Hitchcock 23899, Newf.)

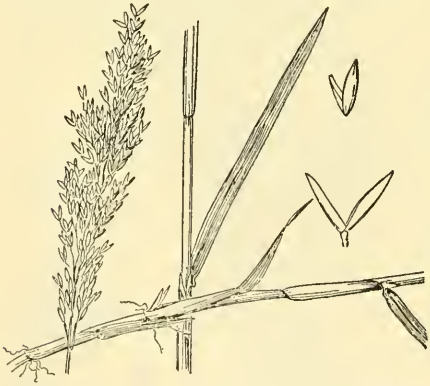

FIGURE 662.—*Agrostis palustris.* Plant, × 1; glumes and floret, × 5. (Hitchcock 11713, Wash.)

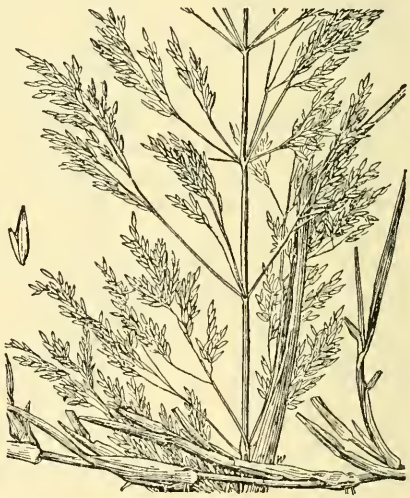

FIGURE 664.—*Agrostis nigra.* Plant, × 1; floret, 5. (Moore 47, cult. Mo. Bot. Gard.)

FIGURE 663.—Distribution of *Agrostis palustris.*

9. Agrostis nígra With. BLACK BENT. (Fig. 664.) Culms long-decumbent at base, also with rather stout leafy stolons, the fertile branches ascending or erect, 20 to 30 cm tall; ligule as in *A. alba;* panicle brown, open as in *A. alba*, but on the average more condensed along the branches, the base usually partly included. 2↓ —Sometimes found mixed with "South German" bent (creeping bent), hence may be a constituent of lawns grown from imported seed; Europe.

10. Agrostis alba L. REDTOP. (Fig. 665.) Differing from *A. stolonifera* in its usually erect more robust culms, sometimes as much as 1 to 1.5 m tall, the base erect or decumbent, with strong creeping rhizomes; blades flat, 5 to 10 mm wide; panicle pyramidal-oblong, reddish, as much as 20 cm long, the branches spreading in anthesis, sometimes contracting later; lemmas rarely awned. ♃ —This is the common redtop cultivated for meadows, pastures, and lawns, extensively escaped in all the cooler parts of the United States; Eurasia. This form appears not to be native in America. Plants growing without cultivation may tend to take on the aspect of *A. stolonifera*. This and the two preceding are closely allied and appear to intergrade. The name *A. palustris* has been erroneously applied to this species in recent works.

FIGURE 665.—*Agrostis alba*. Plant, × ½; 2 spikelets and floret, × 5. (Chase 5191, Mont.)

11. Agrostis ténuis Sibth. COLONIAL BENT. (Fig. 666, *A*.) Culms slender, erect, tufted, usually 20 to 40 cm tall, with short stolons but no creeping rhizomes; ligule short, less than 1 mm or on the culm as much as 2 mm long; blades mostly 5 to 10 cm long, 1 to 3 mm wide; panicle mostly 5 to 10 cm long, open, delicate, the slender branches naked below, the spikelets not crowded. 2↓ (*A. vulgaris* With.)—Cultivated for pastures and lawns in the northeastern United States; escaped and well established throughout those regions; Newfoundland south to Maryland, West Virginia, and Michigan; British Columbia to California (fig. 667); Europe. This species appears not to be native in America; it has been referred to *A. capillaris* L., a distinct species of Europe. In older works this has been called Rhode Island bent. Forms of this species are sometimes called Prince Edward Island, New Zealand, and Rhode Island Colonial bent (noncreeping forms) and Astoria and Oregon Colonial bent (creeping forms).

FIGURE 666.—*A*, *Agrostis tenuis*. Panicle, × 1; glumes, floret, and ligule, × 5. (Waghorne, Newf.) *B*, Var. *aristata*. Floret, × 5. (Gayle 786, Maine.)

FIGURE 667.—Distribution of *Agrostis tenuis*.

AGROSTIS TENUIS var. ARISTÁTA (Parn.) Druce. (Fig. 666, *B*.) Differing from *A. tenuis* in having lemma awned from near the base, the awn usually geniculate and exceeding the glumes. 2↓ —Fields and open woods, Nova Scotia and Quebec to North Carolina; Alaska to Vancouver Island; northern California; Europe. This form appears to be native, at least in the more northerly part of its range.

FIGURE 668.—*Agrostis humilis*. Panicle, × 1; glumes and floret, × 5. (Type.)

12. Agrostis húmilis Vasey. (Fig. 668.) Culms low, tufted, mostly not more than 15 cm tall; leaves mostly basal, the blades flat or folded, usually not more than 1 mm wide; panicle narrow, purple, 1 to 3 cm long, the branches appressed to somewhat spreading; spikelets about 2 mm long; lemma nearly as long as the glumes, awnless; palea about two thirds as long as lemma. 2↓ —Bogs and alpine meadows at high altitudes, Wyoming and Colorado to Washington and Oregon (fig. 669).

13. Agrostis hendersónii Hitchc. (Fig. 670.) Annual; culms about 10 cm tall; ligule 2 to 3 mm long; blades flat or loosely involute, 1 to 3 cm long, about 1 mm wide; panicle condensed, about 2.5 cm long, purplish; spikelets short-pediceled, 5 to 6 mm long; glumes subequal, setaceous-tipped; lemma about 3 mm long, finely 2-toothed, awned from the middle, the awn about 1 cm long, geniculate, the callus pubescent; palea obsolete. ⊙ —Wet ground. Known only from Sams Valley, near Gold Hill, Jackson County, Oreg.

FIGURE 669.—Distribution of *Agrostis humilis*.

14. Agrostis exígua Thurb. (Fig. 671.) Annual; culms delicate, 3 to 10 cm tall, branching from the base; blades 5 to 20 mm long, subinvolute, scabrous; panicle half the length of the plant, finally open; glumes 1.5 mm long, scaberulous; lemma equaling the glumes, scaberulous toward the 2-toothed apex, bearing below the tip a delicate bent awn 4 times as long; palea wanting. ⊙ —Known only from "foothills of the Sierras" (the type) and Howell Mountain, Napa County, Calif.

FIGURE 671.—*Agrostis exigua.* Panicle, × 1; glumes and floret, × 5. (Type.)

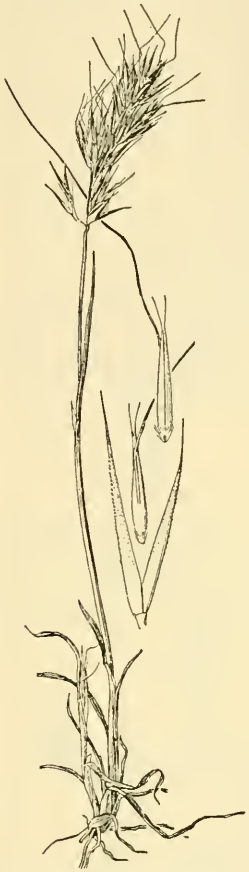

FIGURE 670.—*Agrostis hendersonii.* Plant, × 1; glumes and 2 views of floret, × 5. (Type.)

15. Agrostis elliottiána Schult. (Fig. 672.) Annual; culms slender, erect or decumbent at base, 10 to 40 cm tall; blades flat, about 1 mm wide; panicle finally diffuse, about half the entire height of the plant, the branches capillary, fascicled, the spikelets toward the ends of the branchlets, the whole panicle breaking away at maturity; spikelets 1.5 to 2 mm long; glumes acute; lemma 1 to 1.5 mm long, minutely toothed, the awn attached below the tip, very slender, flexuous, delicately short-pilose, 5 to 10 mm long, sometimes wanting; palea wanting. ⊙ —Fields, waste places, and open ground, Maryland to Illinois, Missouri, and Kansas, south to Georgia, Alabama, and eastern Texas; introduced in Maine and Massachusetts (fig. 673); Yucatan.

FIGURE 672.—*Agrostis elliottiana.* Panicle, × 1; glumes and floret, × 5. (Johnson, Miss.)

FIGURE 673.—Distribution of *Agrostis elliottiana.*

16. Agrostis hállii Vasey. (Fig. 674.) Culms erect, 60 to 90 cm tall, with creeping rhizomes; ligule usually conspicuous, 2 to 7 mm long; blades flat, 2 to 5 mm wide; panicle 10 to 15 cm long, narrow but loose, the branches verticillate; glumes about 4 mm long; lemma awnless, 3 mm long, with a tuft of hairs at base about half as long; palea wanting. ♃ —Mostly in woods near the coast from Oregon to Santa Barbara, Calif. AGROSTIS HALLII var. PRÍNGLEI (Scribn.) Hitchc. Branching, foliage stramineous; blades narrow, usually involute; panicle narrow, compact. ♃ —Near the coast in sand, Mendocino County, Calif.

17. Agrostis lépida Hitchc. (Fig. 675.) Culms tufted, 30 to 40 cm tall, erect, with numerous short rhizomes; ligule, at least on the innovations, as much as 4 mm long; leaves mostly basal, the blades firm, erect, flat or folded, the upper culm leaf below the middle of the culm, the blade 3 cm long or less; panicle purple, 10 to 15 cm long, the branches verticillate, becoming divaricately spreading, the lowermost 2 to 5 cm long; glumes 3 mm long, smooth or nearly so; lemma 2 mm long; palea wanting or very minute. ♃ —Meadows and open woods, Sequoia National Park, and San Bernardino Mountains, Calif., at upper altitudes.

FIGURE 674.—*Agrostis hallii.* Panicle, × 1; glumes and floret, × 5. (Bioletti 110, Calif.)

18. Agrostis pállens Trin. DUNE BENT. (Fig. 676.) Culms erect, 20 to 40 cm tall, with creeping rhizomes; ligule rather firm, 2 to 3 mm long; blades flat or somewhat involute, 1 to 4 mm wide; panicle contracted, almost spikelike, 5 to 10 cm long; glumes 2.5 to 3 mm long; lemma a little shorter than the glumes, awnless; palea wanting. ♃ — Sand dunes along the coast, Washington to central California. Probably only a seacoast form of *A. diegoensis*.

19. Agrostis diegoénsis Vasey. THINGRASS. (Fig. 677.) Culms erect, as much as 1 m tall with creeping rhizomes; blades flat, lax, 2 to 6 mm wide; panicle narrow, open, 10 to 15 cm long, the branches ascending, rather stiff, some of them naked below; spikelets about as in *A. pallens*, awned or awnless. ♃ — Meadows and open woods at low and medium altitudes, Montana and British Columbia to southern California and Nevada (fig. 678).

FIGURE 675.—*Agrostis lepida.* Plant, × ½; glumes and floret, × 5. (Type.)

20. Agrostis blasdálei Hitchc. (Fig. 679.) Culms 10 to 15 cm tall, densely tufted; blades narrow or filiform, rigid, involute, 2 to 4 cm long; panicle strict, narrow, almost spikelike, 2 to 3 cm long, the short branches closely appressed; spikelets 2.5 to 3 mm long; lemma about 1.8 mm long, awnless or with a very short awn just above the middle; palea about 0.3 mm long, nerveless. ♃ —Cliffs near Fort Bragg, Mendocino County, Calif. Previously referred to *A. breviculmis* Hitchc. of Peru.

21. Agrostis róssae Vasey. Ross REDTOP. (Fig. 680.) Culms 10 to 20 cm tall, densely tufted; blades mostly not more than 1 mm wide; panicle contracted, 2 to 6 cm long, the branches appressed;

FIGURE 676.—*Agrostis pallens.* Plant, × 1; glumes and floret, × 5. (Howell, Oreg.)

spikelets green or purple, about 2 mm long; lemma 1.5 mm long, awnless; palea minute. 2↓ —Rocky creeks and mountain slopes at high altitudes, Colorado and Utah to Alberta, Washington, and California. (Fig. 681.) Differs from *A. exarata* in the hard tufted base, the smaller size and the narrower fewer-flowered panicle with appressed branches. What appears to be an awned form occurs in Colorado (Breckenridge and Mount Massive) and British Columbia (Revelstoke).

FIGURE 678.—Distribution of *Agrostis diegoensis.*

FIGURE 677.—*Agrostis diegoensis.* Plant, × 1; glumes and floret, × 5. (Orcutt, Calif.)

22. Agrostis exaráta Trin. SPIKE REDTOP. (Fig. 682, *A.*) Culms 20 to 120 cm tall, mostly tufted, sheaths smooth or somewhat scabrous; ligule prominent; blades flat, 1 to 8 mm wide; panicle narrow,

FIGURE 679.—*Agrostis blasdalei.* Panicle, × 1; glumes and floret, × 5. (Type.)

from somewhat open to close and spikelike, sometimes interrupted, 1 to 25 cm long; glumes acuminate or awn-pointed, nearly equal, 2.5 to 4 mm long, scabrous on the keel and often scaberulous on the back; lemma about 2 mm long, awnless or bearing from about the middle

of the back a straight or bent exserted awn; palea less than 0.5 mm long. 2l —Moist or rather dry open ground, at low and medium altitudes, western Nebraska to Alberta and Alaska, south to New Mexico, California, and Mexico (fig. 683). A variable species. AGROSTIS EXARATA var. MONOLÉPIS (Torr.) Hitchc. (Fig. 682, *B.*) Panicle narrow, often interrupted, lemma awned. 2l (*A. inflata* Scribn., *A. exarata* var. *microphylla* Hitchc.)—Washington to California. AGROSTIS EXARATA var. ÁMPLA (Hitchc.) Hitchc. Robust, panicle large, rather loose, lemma awned. 2l *A. grandis* Trin. is a form with dense panicle as much as 30 cm long. *A. scouleri* Trin. is a northern form with somewhat open panicle. *A. filiculmis* Jones is a slender form with narrow blades and slender few-flowered panicle.

FIGURE 680.—*Agrostis rossae.* Panicle, × 1; glumes and floret, × 5. Hitchcock 23178, Wyo.)

FIGURE 681.—Distribution of *Agrostis rossae.*

FIGURE 683.—Distribution of *Agrostis exarata.*

23. Agrostis califórnica Trin. (Fig. 684.) Culms tufted, usually rather stout, erect or somewhat spreading at base, 15 to 60 cm tall; sheaths sometimes slightly scabrous; ligule truncate, usually shorter than in *A. exarata*, puberulent; blades flat, firm, strongly nerved on the upper surface, usually not more than 10 cm long, those of the culm comparatively broad and short, often 3 to 5 cm long and 3 to 5 mm wide, rarely as much as 10 mm wide; panicle dense, spikelike, sometimes slightly interrupted, mostly 2 to 10 cm long and 5 to 15 mm wide; spikelets about 3 mm long; glumes acute or acuminate, prominently scabrous on the keel and strongly scabrous on the sides; lemma a little shorter than the glumes, awnless or with a straight awn from minute to somewhat exceeding the glumes; palea one-fourth to one-third as long as the lemma. 2l (*A. densiflora* Vasey.)—Sandy soil and cliffs near the sea, Mendocino County to Santa Cruz, Calif. This species has been confused with *A. exarata* and with *A. glomerata* (Presl) Kunth of Peru, which is referable to *A. tolucensis* H.B.K.

FIGURE 682.—*A, Agrostis exarata.* Panicle, × 1; glumes and floret, × 5. (Sheldon 10876, Oreg.) *B,* Var *monolepis.* Panicle, × 1; glumes and floret, × 5. (Congdon, Calif.).

FIGURE 684.—*Agrostis californica.* Panicle, × 1; glumes and floret, × 5. (Anderson, Calif.)

24. Agrostis howéllii Scribn. (Fig. 685.) Culms erect or decumbent at base, 40 to 60 cm tall; blades lax, as much as 30 cm long, 3 to 5 mm wide; panicle loose and open, 10 to 30 cm long, the branches

flexuous, scabrous; spikelets pale, clustered toward the ends of the branches; glumes acuminate, rather narrow and firm, somewhat scabrous on the keel, the first about 3.5 mm long, the second a little shorter; lemma acute, 2.5 mm long, 4-toothed, bearing from near the base an exserted bent awn about 6 mm long; palea wanting. 2l — Known only from Oregon (Multnomah and Hood River Counties).

25. Agrostis hiemális (Walt.) B.S.P. Ticklegrass. (Fig. 686.) Culms slender, usually tufted, 20 to 80 cm tall, leaves usually mostly basal, the blades narrow or almost setaceous; panicle very diffuse, as much as 30 cm long, the branches few, scabrous, long, stiff, and capillary, bearing spikelets near the ends; glumes 1.5 to 2 mm long, acute or acuminate; lemma two-thirds to three-fourths as long as glumes, awnless or rarely awned; palea wanting. 2l (*A. scabra*

Figure 685.—*Agrostis howellii.* Panicle, × 1; glumes and floret, × 5. (Type.)

Willd.)—Meadows and moist open ground at low and medium altitudes, in reduced forms extending into alpine regions, Newfoundland to Alaska, south to Florida, California, and Mexico. At maturity the panicle branches spread widely and the whole panicle breaks away and rolls before the wind. Agrostis hiemalis var. geminata (Trin.) Hitchc. Branches of panicle short and divaricate; lemma awned or awnless. The type specimen, from Alaska, is awned; a large number of specimens over a wide range agree in other respects but are awnless. 2l —At high latitudes and altitudes, Newfoundland to Alaska, south to New Hampshire, North Dakota, Colorado, and California.

26. Agrostis idahoénsis Nash. Idaho redtop. (Fig. 687.) Culms slender, tufted, 10 to 30 cm tall; leaves mostly basal, the blades narrow; panicle loosely spreading, 5 to 10 cm long, the branches capillary, flexuous, minutely scabrous; spikelets 1.5 to 2 mm long; lemma about 1.3 mm long, awnless; palea minute. 2l —Mountain meadows, at medium and high altitudes, western Montana to Washington, south to New Mexico and the high mountains of California; Fairbanks, Alaska (fig. 688). Differs from *A. hiemalis* in the narrower panicle with shorter branches and smaller spikelets.

27. Agrostis bakéri Rydb. (Fig. 689.) Differing from *A. idahoensis* in the larger usually dark purple spikelets (about 2.5 mm long) and in the less flexuous and divaricate panicle branches; lemma with a delicate straight awn or awnless. 2l —Alpine meadows, rare,

FIGURE 686.—*Agrostis hiemalis.* Plant, × ½; glumes and floret, × 5. (Deam 6514, Ind.)

Colorado, Wyoming, Alberta, and Washington. The type has awned spikelets. Awnless specimens referred to this species resemble *A. idahoensis* but have larger spikelets. Probably a form of *A. borealis.*

28. Agrostis perénnans (Walt.) Tuckerm. AUTUMN BENT. (Fig. 690.) Culms erect or somewhat decumbent at base, varying from

weak and lax to relatively stout and tall, 30 to 100 cm tall; leaves rather numerous, the blades lax or stiffly upright, corresponding to the

FIGURE 687.—*Agrostis idahoensis.* Panicle, × 1; glumes and floret, × 5. (Chase 5162, Idaho.)

culms, 1 to 6 mm wide, 10 to 20 cm long; panicle pale, open, oblong, the branches ascending, branching again about the middle; spikelets 2 to 3 mm long; glumes nearly equal, acute or acuminate; lemma 1.5 to 2 mm long, awnless (rarely awned); palea obsolete or nearly so. ♃ —Open ground, old fields, open woods, in rather dry soil from sea level to the tops of the mountains, flowering in late summer or autumn, Quebec to Minnesota, south to Florida and eastern Texas (fig. 691). In dry open ground the culms are erect and rather

FIGURE 688.—Distribution of *Agrostis idahoensis.*

FIGURE 689.—*Agrostis bakeri.* Panicle, × 1; glumes and floret, × 5. (Dupl. type.)

FIGURE 690.—*Agrostis perennans.* Panicle, × 1; glumes and floret, × 5. (Millspaugh 53, W.Va.)

stout; in shady places the plants are lax and the panicle lax with divaricate branchlets.

AGROSTIS PERENNANS var. ELÁTA (Pursh) Hitchc. Differing in the more slender and elongate culms, often decumbent at base, but particularly in the crowding of the spikelets toward the ends of the branchlets, causing them to droop somewhat. 2l —Marshes and bogs mostly near the coast, New Jersey to Mississippi.

FIGURE 691.—Distribution of *Agrostis perennans*.

29. Agrostis oregonénsis Vasey. OREGON REDTOP. (Fig. 692.) Culms 60 to 90 cm tall; blades 2 to 4 mm wide; panicle oblong, 10 to 30 cm long, open, the branches verticillate, rather stiff and ascending, numerous in the lower whorls, the longer 5 to 10 cm long, branching above the middle; glumes 2.5 to 3 mm long; lemma 1.5 mm long, awnless; palea about 0.5 mm long. 2l —Marshes, bogs, and wet meadows, Montana to British Columbia, south to Wyoming and California (fig. 693).

FIGURE 692.—*Agrostis oregonensis*. Panicle, × 1; glumes and floret, × 5. (Hitchcock 23524, Oreg.)

30. Agrostis canína L. VELVET BENT. (Fig. 694.) Culms tufted, 30 to 50 cm tall; blades mostly short and narrow, those of the culm 3 to 6 cm long, usually not more than 2 mm wide; panicle loose and spreading, mostly 5 to 10 cm long; glumes equal, acute, 2 mm long, the lower minutely scabrous on the keel; lemma a little shorter than the glumes, awned about the middle, the awn exserted, bent; callus minutely hairy; palea minute. 2l —Meadows and open ground, Newfoundland to Quebec, south to Delaware and Michigan; possibly native northward but introduced in the United States (fig. 695); Europe. Sometimes cultivated for putting greens.

FIGURE 693.—Distribution of *Agrostis oregonensis*.

31. Agrostis boreális Hartm. (Fig. 696.) Culms tufted, 20 to 40 cm tall, or, in alpine or high northern plants, dwarf; leaves mostly basal, the blades 5 to 10 cm long, 1 to 3 mm wide; panicle pyramidal, 5 to 15 cm long, the lower branches whorled and spreading; glumes 2.5 to 3 mm long, acute; lemma a little shorter than the glumes, awned, the awn usually bent and exserted; palea obsolete or nearly so. 2l —Rocky slopes and moist banks at high latitudes and altitudes, Newfoundland and Greenland to Alaska, south to the high mountains of New England and New York; West Virginia; summit of Roan Mountain, N.C. (fig. 697); northern Europe.

FIGURE 694.—*Agrostis canina*. Panicle, × 1; glumes and floret, × 5. (Commons 99, Del.)

32. Agrostis longilígula Hitchc. (Fig. 698.) Culms erect, about 60 cm tall; ligule 5 to 6 mm long; blades 10 to 15 cm long, 3 to 4 mm wide, scabrous; panicle narrow, but loosely flowered, bronze-purple, 10 to 15 cm long, the branches very scabrous; glumes 4 mm long; lemma 2.5 mm long, bearing at the middle a bent exserted awn; palea minute. ♃ —Bogs and marshes at low altitudes, Tillamook County, Oreg., to Mendocino County, Calif.

FIGURE 695.—Distribution of *Agrostis canina.*

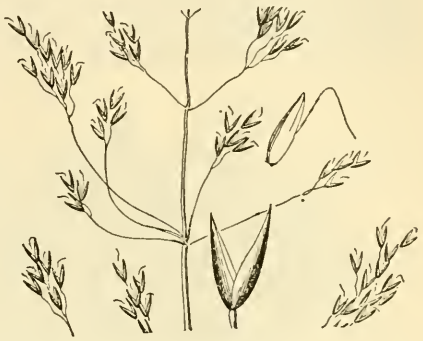

FIGURE 696.—*Agrostis borealis.* Panicle, × 1; glumes and floret, × 5. (Faxon 99, N.H.)

AGROSTIS NEBULÓSA Bois. and Reut. CLOUDGRASS. Culms slender, branching about 30 cm tall; foliage scant; panicle delicate, oblong, half as long as the plant, the branches in verticils; spikelets 1 mm long. ⊙ (Sometimes called *A. capillaris*, not *A. capillaris* L.)—Cultivated for dry bouquets. Spain.

65. PHÍPPSIA (Trin.) R. Br.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, not prolonged; glumes unequal, minute, the first sometimes wanting; lemma thin, somewhat keeled, 3-nerved, abruptly acute; palea a little shorter than the lemma, dentate. Dwarf, tufted perennial, with narrow, few-flowered panicles of small spikelets. Type species, *Phippsia algida.* Named for C. J. Phipps.

FIGURE 697.—Distribution of *Agrostis borealis.*

1. Phippsia álgida (Soland.) R. Br. (Fig. 699.) Culms densely tufted, 2 to 10 cm tall; blades soft, narrow, with boat-shaped tip; lemma about 1.5 mm long. ♃ —Summit of Gray's Peak, Colo.; Arctic regions of both hemispheres.

FIGURE 698.—*Agrostis longiligula.* Panicle, × 1; glumes and floret, × 5. (Type.)

66. COLEÁNTHUS Seidel

Spikelets 1-flowered; glumes wanting; lemma ovate, hyaline, terminating in a short awn; palea broad, 2-toothed, the keels awn-tipped. Dwarf annual, with short flat blades and small panicles. Type species, *Coleanthus subtilis.* Name from Greek *koleos*, sheath, and *anthos*, flower, alluding to the sheaths enclosing the base of the panicles.

1. Coleanthus súbtilis (Tratt.) Seidel. (Fig. 700.) Culms spreading, forming little mats, mostly less than 5 cm long; panicle 5 to 10 mm long, the short branches verticillate; lemma about 1 mm long, the awn about equaling the dark caryopsis. ⊙ —Mud flats along the lower Columbia River, Oregon and Washington, well established but probably introduced; northern Eurasia.

FIGURE 699.—*Phippsia algida.* Plant, × ½; glumes and floret, × 10. (Oldmixon, Alaska.)

Mibóra mínima (L.) Desv. Delicate annual 3 to 10 cm tall with short narrow blades and slender racemes of 6 to 8 appressed purple spikelets, 2 mm long, the glumes obtuse, the lemma and palea shorter, pubescent. ⊙ —Plymouth, Mass.; introduced from Europe.

FIGURE 700.—*Coleanthus subtilis.* Plant, × 1; lemma and palea and two views of spikelet with ripe caryopsis, × 20. (Howell, Oreg.)

67. CÍNNA L. WOODREED

Spikelets 1-flowered disarticulating below the glumes, the rachilla forming a stipe below the floret and produced behind the palea as a minute bristle; glumes equal or subequal, 1- to 3-nerved; lemma similar to the glumes, nearly as long, 3-nerved, bearing a minute, short, straight awn just below the apex (rarely awnless); palea 1-keeled. Tall perennials with flat blades and close or open panicles. Type species, *Cinna arundinacea.* *Cinna* (kinna) an old Greek name for a grass.

FIGURE 701.—*A, Cinna arundinacea.* Plant, × ½; glumes and floret, × 10. (Dewey 336, Va.) *B, C. latifolia.* Panicle, × 1; glumes and floret, × 10. (Sandberg 713, Minn.)

Our two species furnish highly palatable forage but usually are not abundant enough to be of much importance.

Spikelets 5 mm long; panicle rather dense, the branches ascending.
1. C. ARUNDINACEA.
Spikelets 3.5 to 4 mm long; panicle loose, the branches spreading or drooping.
2. C. LATIFOLIA.

1. Cinna arundinácea L. STOUT WOODREED. (Fig. 701, *A*.) Culms erect, usually 1 to 1.5 m tall, often somewhat bulbous at base, solitary or few in a tuft; sheaths glabrous; ligule rather prominent, thin; blades flat, scabrous, mostly less than 1 cm wide; panicle many-flowered, nodding, grayish, 15 to 30 cm long, the branches ascending; spikelets about 5 mm long; glumes somewhat unequal, acute, the second 3-nerved; lemma usually a little longer than the first glume, bearing below the tip a minute straight awn; palea apparently 1-nerved. ♃ —Moist woods, Maine to South Dakota, south to Georgia and eastern Texas (fig. 702).

2. Cinna latifólia (Trevir.) Griseb. DROOPING WOODREED. (Fig. 701, *B*.) Resembling *C. arundinacea;* blades shorter and on the average wider, as much as 1.5 cm wide; panicle green, looser, the branches fewer, spreading or drooping, naked at base for as much as

FIGURE 702.—Distribution of *Cinna arundinacea.*

FIGURE 703.—Distribution of *Cinna latifolia.*

5 cm; spikelets about 4 mm long; awn of lemma sometimes as much as 1 mm long (rarely wanting); palea 2-nerved, the nerves very close together. ♃ —Moist woods, Newfoundland and Labrador to Alaska, south to Connecticut, in the mountains to North Carolina, to Michigan, Illinois, South Dakota, in the Rocky Mountains to northern New Mexico, to Utah and central California (fig. 703); northern Eurasia.

68. LIMNÓDEA L. H. Dewey

Spikelets 1-flowered, disarticulating below the glumes, the rachilla prolonged behind the palea as a short slender bristle; glumes equal, firm; lemma membranaceous, smooth, nerveless, 2-toothed at the apex, bearing from between the teeth a slender bent awn, twisted at base; palea a little shorter than the lemma. Slender annual with flat blades and narrow panicles. Type species, *Limnodea arkansana.* Name altered from *Limnas,* a genus of grasses.

1. Limnodea arkansána (Nutt.) L. H. Dewey. (Fig. 704.) Culms branching at base, 20 to 40 cm tall; blades more or less pubescent on both surfaces; panicle 5 to 15 cm long, narrow but loose; spikelets 3.5 to 4 mm long; glumes hispidulous or pilose; awn 8 to 10 mm long. ♃ —Dry soil, prairies and river banks, Coastal Plain, Florida

to Texas, Arkansas, and Oklahoma (fig. 705). The form with pilose glumes has been called *L. arkansana* var. *pilosa* (Trin.) Scribn.

69. ALOPECÚRUS L
Foxtail

Spikelets 1-flowered, disarticulating below the glumes, strongly compressed laterally; glumes equal, usually united at base, ciliate on the keel; lemma about as long as the glumes, 5-nerved, obtuse, the margins united at base, bearing from below the middle a slender dorsal awn, this included or exserted two or three times the length of the spikelet; palea wanting. Low or moderately tall perennials or rarely annuals, with flat blades and soft, dense, spikelike panicles. Type

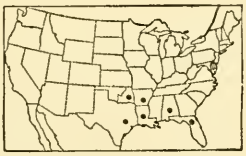

Figure 705.—Distribution of *Limnodea arkansana*.

species, *Alopecurus pratensis*. Name from Greek *alopex*, fox, and *oura* tail, alluding to the cylindric panicle.

The species of *Alopecurus* are all palatable and nutritious forage grasses, but usually are not found in sufficient abundance to be of great importance. *A. pratensis*, meadow foxtail, is sometimes used as a meadow grass in the eastern United States; *A. aequalis* is the most common on the western ranges.

Figure 704.—*Limnodea arkansana*. Plant, × ½; glumes and floret, × 10. (Orcutt 5910, Tex.)

FIGURE 706.—*A*, *Alopecurus pratensis*. Plant, × ½; glumes and floret, × 10. (Henderson, Oreg.) *B*, *A. myosuroides*. Glumes and floret, × 10. (Commons 14, Del.)

Spikelets 5 to 6 mm long. Introduced perennials.
Panicle slender, tapering at each end; glumes scabrous on the keel. 1. A. MYOSUROIDES.
Panicle cylindric, dense; glumes conspicuously ciliate on the keel. 2. A. PRATENSIS.
Spikelets 2 to 4 mm long (rarely 5 mm in *A. saccatus*, annual). Native species.
Plants perennial.
Spikelets densely woolly all over; panicle oblong, 1 to 5 cm long, about 1 cm thick---------- 3. A. ALPINUS.
Spikelets not woolly; panicle linear or oblong-linear, less than 1 cm thick.
Awn scarcely exceeding the glumes---------- 5. A. AEQUALIS.
Awn exserted 2 mm or more.
Awn exserted 2 to 3 mm; panicle 3 to 4 mm thick; spikelets 2.5 mm long. 6. A. GENICULATUS.
Awn exserted 3 to 5 mm; panicle 4 to 6 mm thick; spikelets about 3 mm long---------- 4. A. PALLESCENS.
Plants annual.
Spikelets 4 to 5 mm long; panicle relatively loose------ 9. A. SACCATUS.
Spikelets 2 to 3.5 mm long; panicle dense.
Spikelets 2 to 2.5 mm long; anthers 0.5 mm long--- 7. A. CAROLINIANUS.
Spikelets 3 to 3.5 mm long; anthers about 1 mm long-- 8. A. HOWELLII.

1. Alopecurus myosuroídes Huds. (Fig. 706, *B*.) Perennial; culms tufted, slightly scabrous, 10 to 50 cm tall, erect or decumbent at base; blades usually 2 to 3 mm wide; panicle slender, somewhat tapering at each end, 4 to 10 cm long, 3 to 5 mm wide; glumes 6 mm

FIGURE 707.—Distribution of *Alopecurus myosuroides*.

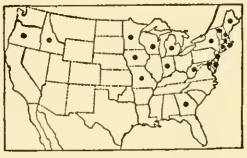

FIGURE 708.—Distribution of *Alopecurus pratensis*.

long, pointed, whitish with 3 green nerves, glabrous, scabrous on the keel, short-ciliate at base; lemma about as long as the glumes, the awn bent, exserted 5 to 8 mm. ♃ (*A. agrestis* L.)—Fields, waste places, and ballast ground, Maine to North Carolina, Washington, and Oregon (fig. 707); introduced, rare; Eurasia.

2. Alopecurus praténsis L. MEADOW FOXTAIL. (Fig. 706, *A*.) Perennial; culms erect, 30 to 80 cm tall; blades 2 to 6 mm wide; panicle 3 to 7 cm long, 7 to 10 mm thick; glumes 5 mm long, villous on the keel and pubescent on the sides; awn exserted 2 to 5 mm. ♃ —Fields and waste places, Newfoundland and Labrador to Alaska, south to Delaware, Iowa, Idaho, and Oregon (fig. 708); introduced; Eurasia. Occasionally cultivated as a meadow grass.

3. Alopecurus alpínus J. E. Smith. ALPINE FOXTAIL. (Fig. 709.) Perennial; culms erect or often decumbent at base, rather stiff and rushlike, 10 to 80 cm tall, with slender rhizomes; sheaths glabrous, often inflated; blades 3 to 5 mm wide; panicle ovoid or oblong, 1 to 3 cm long, about 1 cm wide, woolly; glumes 3 to 4 mm long, woolly; lemma awned near the base, the awn exserted slightly or as much as 5 mm. ♃ —Mountain meadows and along brooks, Greenland to Alaska, south in the Rocky Mountains to Colorado (fig. 710); Arctic regions and northern Eurasia.

4. Alopecurus palléscens Piper. WASHINGTON FOXTAIL. (Fig. 711.) Perennial, tufted, pale-green; culms 30 to 50 cm tall, erect, or lower nodes geniculate; sheaths somewhat inflated; panicle pale,

dense, 2 to 7 cm long, 4 to 6 mm thick; glumes about 3 mm long, ciliate on the keel, appressed-pubescent on the sides; awn attached near base of lemma, exserted 3 to 5 mm; anthers about 2 mm long. 2l — Edges of ponds and wet places, Idaho to Washington and northern California (fig. 712).

FIGURE 709.—*Alopecurus alpinus*. Panicle, × 1; glumes and floret, × 10. (Hall and Harbour 682, Colo.)

5. Alopecurus aequális Sobol. SHORT-AWN FOXTAIL. (Fig. 713.) Perennial; culms erect or spreading, usually not rooting at the nodes, 15 to 60 cm tall; blades 1 to 4 mm wide; panicle slender, 2 to 7 cm long, about 4 mm wide; spikelets 2 mm long; awn of lemma scarcely exserted; anthers about 1 mm long. 2l (*A. aristulatus* Michx.)—In water and wet places, Greenland to Alaska, south to Pennsylvania, Illinois, Kansas, New Mexico, and California (fig. 714); Eurasia.

FIGURE 710.—Distribution of *Alopecurus alpinus*.

6. Alopecurus geniculátus L. WATER FOXTAIL. (Fig. 715.) Differing from *A. aequalis* chiefly in the usually more decumbent culms rooting at the nodes and the longer awn exserted 2 to 3 mm; giving the panicle a softly bristly appearance; spikelets about 2.5 mm long, the tip dark purple; awn of lemma about as long again as the spikelet; anthers about 1.5 mm long. 2l —In water and wet places, Newfoundland to Saskatchewan and British Columbia, south through New England to New York, New Jersey, and Virginia, and through Washington to California; Montana, Colorado, Arizona (fig. 716); Eurasia.

FIGURE 712.—Distribution of *Alopecurus pallescens*.

7. Alopecurus carolinianus Walt. (Fig. 717.) Annual; culms tufted, much branched at base, 10 to 50 cm tall; similar to *A. geniculatus* and *A. aequalis*, but panicle more slender than in the former; spikelets 2 to 2.5 mm long, pale, the awn as in *A. geniculatus;* anthers about 0.5 mm long. ⊙ (*A. ramosus* Poir.)—Moist open ground, old fields, and wet places, New Jersey to British Columbia, south to Florida, Texas, Arizona, and California (fig. 718).

FIGURE 711.—*Alopecurus pallescens*. Panicle, × 1; glumes and floret, × 10. (Piper 4208, Wash.)

8. Alopecurus howéllii Vasey. (Fig. 719.) Annual; culms 15 to 30 cm tall, commonly geniculate at lower nodes; sheaths, especially the uppermost, more or less inflated; panicle oblong to linear, 2 to 6

cm long, 4 to 7 mm wide; glumes 3 to 3.5 mm long, ciliate on the keel, appressed-pilose on the lateral nerves; awn attached less than 1 mm from the base of lemma, bent, exserted 3 to 5 mm; anthers orange, about 1 mm long. ⊙ —Wet places, Oregon and California. This species and the following are closely related and may not be distinct. Both have dwarf specimens with small panicles short-exserted or partly included in the inflated upper sheath.

FIGURE 713.—*Alopecurus aequalis*. Panicle, × 1; glumes and floret, × 10. (Fernald, Maine.)

9. Alopecurus saccátus Vasey. (Fig. 720.) On the average somewhat lower than *A. howellii*, the upper sheaths inflated, the panicle 2 to 4 cm long, rather less dense, short exserted or partly included; spikelets 4 to 5 mm long, the awn exserted 5 to 8 mm; anthers 1 mm long. ⊙ —Wet places, along the Columbia River, Washington and Oregon, California (Colusa County).

FIGURE 714.—Distribution of *Alopecurus aequalis*.

Alopecurus créticus. Trin. Annual, 10 to 40 cm tall; panicle dense; spikelets wedge-shaped, 4 mm long; glumes firm, the keels broadly winged toward the summit, ciliate; lemma truncate, the awn from near the base. ⊙ — Ballast, Philadelphia, Pa.; Europe.

70. POLYPÓGON Desf.

Spikelets 1-flowered, the pedicel disarticulating a short distance below the glumes, leaving a short-pointed callus attached; glumes equal, entire or 2-lobed, awned from the tip or from between the lobes, the awn slender, straight; lemma much shorter than the glumes, hyaline, usually bearing a slender straight awn shorter than the awns of the glumes. Usually decumbent annuals or perennials with flat scabrous blades and dense, bristly, spikelike panicles. Type species, *Polypogon monspeliensis*. Name from Greek *polus*, much, and *pogon*, beard, alluding to the bristly inflorescence.

FIGURE 716.—Distribution of *Alopecurus geniculatus*.

One species, *P. monspeliensis*, is palatable to stock and is sometimes sufficiently abundant on low meadows to be of importance in the West.

FIGURE 715.—*Alopecurus geniculatus*. Panicle, × 1; glumes and floret, × 10. (Weatherby 3394, Mass.)

Plants annual.

Glumes slightly lobed, the lobes not ciliate_____ 1. P. MONSPELIENSIS.

Glumes prominently lobed, the lobes ciliate-fringed__ 2. P. MARITIMUS.

Plants perennial.

Awns rather stiff and straight; glumes 2.5 to 3 mm long____ 3. P. LUTOSUS.

Awns delicate, flexuous; glumes 1.5 to 2 mm long_____ 4. P. AUSTRALIS.

1. Polypogon monspeliénsis (L.) Desf. RABBITFOOT GRASS. (Fig. 721, *A*.) Annual; culms erect or decumbent at base, 15 to 50 cm tall (sometimes depauperate or as much as 1 m tall); ligule 5 to 6 mm long; blades in average plants 4 to 6 mm wide; panicle dense, spikelike, 2 to 15 cm long, 1 to 2 cm wide, tawny-yellow when mature; glumes hispidulous, about 2 mm long, the awns 6 to 8 mm long, rarely longer; lemma smooth and shining, about half as long as the glumes, the delicate awn slightly exceeding them. ⊙ —Ballast and waste places, New Brunswick to Georgia, west to Alaska and California, infrequent in the East, mostly confined to the coastal States, a common weed in the Western States; at low altitudes, south to Argentina (fig. 722); introduced from Europe.

FIGURE 717.—*Alopecurus carolinianus*. Plant, × 1; glumes and floret, × 10. (Kearney 1147, Va.)

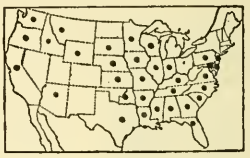

FIGURE 718.—Distribution of *Alopecurus carolinianus*.

2. Polypogon marítimus Willd. (Fig. 721, *B*.) Annual; culms 20 to 30 cm tall, upright or spreading; ligule as much as 6 mm long; blades usually less than 5 cm long, 2 to 4 mm wide; panicle mostly smaller and less dense than in *P. monspeliensis;* glumes about 2.5 mm long, hispidulous below, the deep lobes ciliate-fringed, the awns 7 to 10 mm long; lemma awnless. ⊙ —Introduced, Georgia (Tybee Island), California (Napa and New York Falls, Amador County); Mediterranean region.

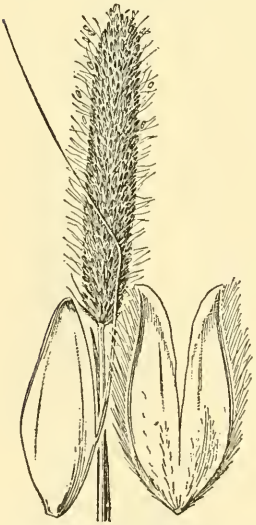

FIGURE 719.—*Alopecurus howellii*. Panicle, × 1; glumes and floret, × 10. (Gilbert 78, Oreg.)

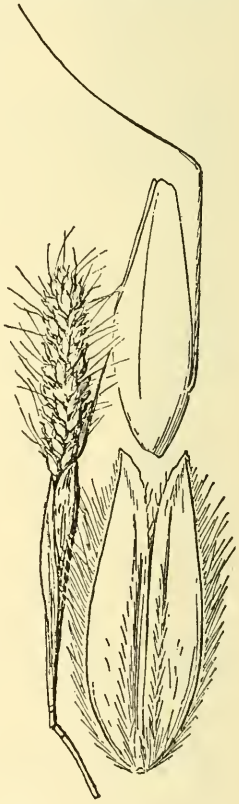

FIGURE 720.—*Alopecurus saccatus*. Panicle, × 1; glumes × and floret, 10. (Suksdorf 188, Wash.)

3. Polypogon lutósus (Poir.) Hitchc. DITCH POLYPOGON. (Fig. 723.) Perennial; culms tufted, geniculate at base, 30 to 80 cm tall; ligule 2 to 5 mm long or the uppermost longer; blades commonly 4 to 6 mm wide; panicle oblong, 5 to 15 cm long, more or less interrupted or lobed; glumes equal, 2.5 to 3 mm long, scabrous, the awns 3 to 5

FIGURE 721.—*A*, *Polypogon monspeliensis*. Plant, × ½; glumes and floret, × 10. (Chase 5584, Calif.)
B, *A. maritimus*, × 10. (Hansen 607, Calif.)

mm long; lemma smooth and shining, 1 mm long, minutely toothed at the truncate apex, the awn exceeding the glumes. 2↓ —Ditches and wet places at low altitudes, British Columbia to New Mexico and California, east to Louisiana, south to Argentina; a few localities from Alabama to Texas (fig. 724); introduced from Europe.

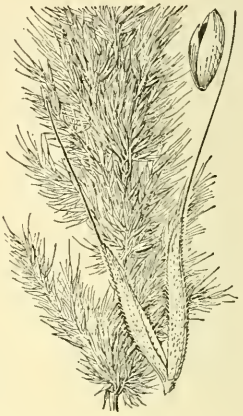

FIGURE 723.—*Polypogon lutosus.* Panicle, × 1; glumes and floret, × 10. (Hitchcock 2686, Calif.)

4. Polypogon austrális Brongn. (Fig. 725.) Perennial; culms as much as 1 m tall; ligule 2 to 3 mm long, fragile; blades commonly 5 to 7 mm wide; panicle soft, lobed or interrupted, mostly 8 to 15 cm long, the numerous awns purplish; glumes 1.5 to 2 mm long, hispidulous, the awn flexuous, delicate, 4 to 6 mm long; lemma about two thirds as long as the glumes, the awn about 3 mm long. 2↓ (*P. crinitus* Trin., not Nutt.)—Introduced at Bingen, Wash.; Chile and Argentina.

FIGURE 722.—Distribution of *Polypogon monspeliensis.*

71. LYCÚRUS H.B.K.

Spikelets 1-flowered; glumes awned, the first usually 2-awned; lemma narrow, firm, longer than the glumes, tapering into a slender awn. Slender perennial, with grayish, bristly spikelike panicles, the spikelets borne in pairs, the lower of the pair sterile, the two falling together. Type species, *Lycurus phleoides.* Name for Greek *lukos,* wolf, and *oura,* tail, alluding to the spikelike panicles.

FIGURE 725.—*Polypogon australis* × 10. (Suksdorf 10091, Wash.)

1. Lycurus phleoides H.B.K. WOLFTAIL. (Fig. 726.) Culms densely tufted, 20 to 60 cm tall, compressed, erect or decumbent at base; blades flat or folded, 1 to 2 mm wide, those of the culm mostly less than 10 cm long; panicle 3 to 6 cm long, about 5 mm thick; spikelets including awns about 5 mm long, the glumes shorter than the lemma, the first 2- or 3-awned, the second usually 1-awned, the awns slightly spreading; lemma 3-nerved, pubescent at the margins, the awn 2 to 3 mm long; palea about as long as the lemma, pubescent. 2↓ —Plains and rocky hills, Colorado to Texas and Arizona, south to southern Mexico (fig. 727). An important southwestern forage grass.

FIGURE 724.—Distribution of *Polypogon lutosus.*

72. PHLÉUM L. TIMOTHY

Spikelets 1-flowered, laterally compressed, disarticulating above the glumes; glumes equal, membranaceous, keeled, abruptly mucronate or awned or gradually acute; lemma shorter than the glumes, hyaline, broadly truncate, 3- to 5-nerved; palea narrow, nearly as long as the

lemma. Annuals or perennials, with erect culms, flat blades, and dense, cylindric panicles. Type species, *Phleum pratense*. Name from Greek *phleos*, an old name for a marsh reed.

The common species, *P. pratense*, or timothy, is our most important hay grass. It is cultivated in the humid regions, the Northeastern States, south to the Cotton Belt, and west to the 100th meridian, and also in the humid region of Puget Sound and in mountain districts. The native species, *P. alpinum*, alpine timothy, furnishes forage in mountain meadows of the Western States.

Panicle cylindric, several times longer than wide ..... 1. P. PRATENSE.
Panicle ovoid or oblong, usually not more than twice as long as wide.
2. P. ALPINUM.

1. Phleum praténse L. TIMOTHY. (Fig. 728, *A*.) Culms 50 to 100 cm

FIGURE 727.—Distribution of *Lycurus phleoides*.

tall, from a swollen or bulblike base, forming large clumps; blades elongate, mostly 5 to 8 mm wide; panicle cylindric, commonly 5 to 10 cm long, often longer, the spikelets crowded, spreading; glumes about 3.5 mm long, truncate with a stout awn 1 mm long, pectinate-ciliate on the keel. ♃ —Commonly escaped from cultivation along roadsides and in fields and waste places throughout the United States; Eurasia. In some localities known as herd's grass.

2. Phleum alpínum L. ALPINE TIMOTHY. (Fig. 728, *B*.) Culms 20 to 50 cm tall, from a decumbent, somewhat creeping, densely tufted base; blades mostly less than 10 cm long, 4 to 6 mm wide; panicle ellipsoid or short-cylindric, bristly; glumes about 5 mm long, hispid-ciliate on the keel, the awns 2 mm long. ♃ —Common in

FIGURE 726.—*Lycurus phleoides*. Plant, × ½; glumes and floret, × 10. (Rydberg 2363, Colo.)

FIGURE 728.—*A, Phleum pratense.* Plant, × ½; glumes and floret, × 10. (Mearns 2209, Wyo.) *B, P. alpinum.* Panicle, × 1; glumes and floret, × 10. (Clements 337, Colo.)

mountain meadows, in bogs and wet places, Greenland to Alaska, south in the mountains of Maine and New Hampshire; northern Michigan; in the mountains of the Western States to New Mexico and California, also on the seacoast at Fort Bragg, Calif., and northward (fig. 729); Eurasia and Arctic and alpine regions of the Southern Hemisphere.

Phleum arenárium L. Annual; culms tufted, 5 to 30 cm tall; foliage scant, mostly basal, the blades 2 to 4 cm long; panicle 1 to 3 cm long, somewhat tapering at each end; glumes acuminate, strongly ciliate on the keel. ⊙ —Ballast near Portland, Oreg.; coast of Europe and North Africa.

Phleum subulátum (Savi) Aschers. and Graebn. Annual; culms 10 to 20 cm tall; blades 2 to 5 cm long; panicle linear-oblong, mostly 3 to 8 cm long, 4 to 5 mm thick; glumes 2 mm long, scaberulous, subacute, the tips approaching. ⊙ —Ballast, Philadelphia, Pa., and near Portland, Oreg.; Mediterranean region.

FIGURE 729.—Distribution of *Phleum alpinum*.

Phleum paniculátum Huds. Annual; culms 10 to 30 cm tall; foliage scabrous; panicle cylindric, 2 to 5 cm long, 3 to 6 mm thick; glumes 2 mm long, glabrous, hard, widened upward to a truncate swollen summit, with a hard awn-point at the tip. ⊙ —Ballast near Portland, Oreg.; Mediterranean region.

73. GASTRÍDIUM Beauv.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, prolonged behind the palea as a minute bristle; glumes narrow, unequal, somewhat swollen at the base; lemma much shorter than the glumes, hyaline, broad, truncate, awned or awnless; palea about as long as the lemma. Annual with flat blades and pale, shining, spikelike panicles. Type species, *Milium lendigerum* L. (*G. ventricosum*). Name from Greek *gastridion*, a small pouch, alluding to the slightly saccate glumes.

1. Gastridium ventricósum (Gouan) Schinz and Thell. NIT-GRASS. (Fig. 730.) Culms 20 to 40 cm tall; foliage scant, blades scabrous; panicle 5 to 8 cm long, dense, spikelike; spikelets slender, about 5 mm long; glumes tapering into a long point, the second about one fourth shorter than the first; floret minute, plump, pubescent, the delicate awn 5 mm long, somewhat geniculate. ⊙ —Open ground and waste places, Oregon to California; Texas; also Boston, Mass.; introduced from Europe. A common weed on the Pacific coast, but of no economic value.

74. LAGÚRUS L.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, pilose under the floret, produced beyond the palea as a bristle; glumes subequal, thin, 1-nerved, villous, gradually tapering into a plumose awn-point; lemma shorter than the glumes, thin, glabrous, bearing on the back above the middle a slender, exserted, somewhat geniculate, awn, the summit bifid, the divisions delicately awn-tipped; palea narrow, thin, the two keels ending in minute awns. Annual, with pale, dense, ovoid or oblong woolly heads. Type species, *Lagurus*

FIGURE 730.—*Gastridium ventricosum*. Plant, × ½; glumes and floret, × 10. (Davy and Blasdale 5340, Calif.)

ovatus. Name from Greek *lagos*, hare, and *oura*, tail, alluding to the woolly heads.

1. Lagurus ovátus L. (Fig. 731.) Culms branching at the base, 10 to 30 cm tall, slender, pubescent; sheaths and blades pubescent, the sheaths somewhat inflated, the blades flat, lax; panicle 2 to 3 cm long, nearly as thick, pale and downy, bristling with dark awns; glumes very narrow, 10 mm long, the awns of the lemmas much exceeding them. ⊙ —Cultivated for ornament and sparingly escaped; has been found at Pacific Grove, San Francisco, and Berkeley, Calif.; ballast, Beaufort, N.C.; Mediterranean region.

75. MUHLENBÉRGIA Schreb. MUHLY

Spikelets 1-flowered (occasionally 2-flowered in *M. asperifolia*), the rachilla disarticulating above the glumes; glumes usually shorter than the lemma, sometimes as long, obtuse to acuminate or awned, keeled or convex on the back, the first sometimes small, rarely obsolete; lemma firm-membranaceous, 3-nerved (the nerves sometimes obscure or rarely an obscure additional pair), with a very short callus, rarely long-pilose, usually minutely pilose, the apex acute, awned from the tip or just below it, or from between very short lobes, sometimes only mucronate, the awn straight or flexuous. Perennial or rarely annual low or moderately tall or rarely robust grasses, tufted or rhizomatous, the culms simple or much-branched, the inflorescence a narrow (sometimes spikelike) or open panicle.

Type species, *Muhlenbergia schreberi*. Named for G. H. E. Muhlenberg. Many of the western species are important range grasses and often

FIGURE 731.—*Lagurus ovatus*. Plant, × ½; spikelet and floret, × 5. (Heller 5340, Calif.)

form a considerable proportion of the grass flora of the arid and semiarid regions. The most important of these are *M. montana* on

mesas and rocky hills of the Western States, *M. pauciflora*, *M. emersleyi*, and *M. wrightii* in the Southwest.

1a. Plants annual (see also *M. uniflora*).
Glumes pilose; spikelets on slender pedicels---- 1. M. TEXANA.
Glumes glabrous; spikelets on short thick pedicels.
Panicles narrow but loose; awn 1 to 3 cm long---- 2. M. MICROSPERMA.
Panicles more or less spikelike; awn reduced to a mucronate point, sometimes as much as 1 mm long.
Lemma about 4 mm long---- 3. M. DEPAUPERATA.
Lemma about 2 mm long---- 4. M. FILIFORMIS.
1b. Plant perennial.
2a. Creeping rhizomes present or the slender decumbent base rooting at the nodes (rhizomes short in *M. dumosa* and *M. californica*).
3a. Rhizomes wanting; base of slender branching culms decumbent and rooting at nodes.
Spikelets awnless---- 15. M. UNIFLORA.
Spikelets awned.
Glumes minute, the first often obsolete---- 30. M. SCHREBERI.
Glumes evident (see also *M. schreberi* var. *palustris*).
31. M. CURTISETOSA.
3b. Rhizomes usually prominent, scaly, creeping.
4a. Panicles open, the spikelets on slender pedicels.
Spikelets awned, 4 to 5 mm long; blades involute-- 16. M. PUNGENS.
Spikelets awnless, acutish or mucronate, 1 to 2 mm long; blades flat.
Panicle oblong; eastern species---- 14. M. TORREYANA.
Panicle as broad as long; western species.
Ligule 1 to 2 mm long, auricled---- 12. M. ARENACEA.
Ligule minute, not auricled---- 13. M. ASPERIFOLIA.
4b. Panicles narrow, more or less condensed, the spikelets on short pedicels.
5a. Hairs at base of floret copious, as long as the body of the lemma.
32. M. ANDINA.
5b. Hairs at base of floret inconspicuous, not more than half as long as the lemma.
6a. Blades 2 mm wide or less, mostly short and involute,
Culms tall, stout, somewhat woody at base, as much as 6 mm thick, 1 to 3 m tall---- 19. M. DUMOSA.
Culms lower, slender.
Blades mostly 5 to 10 cm, rarely 15 cm long- 20. M. GLAUCA.
Blades mostly less than 5 cm long.
Culms widely creeping, the blades fine, conspicuously recurved-spreading. Culms smooth. Ligule less than 1 mm long.
Spikelets about 3 mm long---- 5. M. REPENS.
Spikelets about 2 mm long---- 6. M. UTILIS.
Culms erect or decumbent at base, not widely creeping (sometimes spreading in *M. squarrosa*).
Glumes ovate, about half as long as the floret; ligule 2 to 3 mm long. Culm nodulose-roughened.
7. M. SQUARROSA.
Glumes a little shorter than the floret; ligule minute.
Plants forming dense cushions; sheaths glabrous; leaves crowded toward the base, the blades involute; lemma mucronate to short awned---- 8. M. THURBERI.
Plants forming loose bunches; sheaths pubescent; leaves not crowded, the blades flat; lemma with an awn 1 to 3 mm long---- 9. M. CURTIFOLIA.
6b. Blades flat, at least some of them more than 3 mm wide.
7a. Panicles loosely flowered, slender, much exceeding the leaves (see also *M. sylvatica*); glumes broad below, abruptly pointed, shorter than the body of the lemma.
Culms slender, rather weak, becoming much branched, glabrous or slightly scabrous below the nodes. Lemma acuminate, 2.5 to 3.5 mm long, awned---- 24. M. BRACHYPHYLLA.
Culms erect, simple or sparingly branched.
Spikelets 1.5 to 2.5 mm long; lemma awnless or awn-tipped; blades commonly not more than 5 to 7 mm wide.
22. M. SOBOLIFERA.

Spikelets 3 to 4 mm long; lemma with an awn 2 to 5 times as long as the body; blades commonly 8 mm or more wide. 23. M. TENUIFLORA.

7b. Panicles usually densely flowered (sometimes loosely in *M. sylvatica*); culms commonly freely branching (sparingly so or even simple in *M. racemosa*); blades mostly not more than 5 mm wide, usually ascending; glumes tapering from base to apex.

Glumes with stiff awn-tips, much exceeding the awnless lemma; panicles terminal on the culm or leafy branches, compact, interrupted, bristly---------- 25. M. RACEMOSA.

Glumes acuminate, sometimes awn-tipped but not stiff and exceeding the lemma; panicles terminal and axillary, numerous, not bristly.

Culms glabrous below the nodes; panicles not compact, the branches ascending; plants sprawling-topheavy, the branchlets geniculate-spreading----- 26. M. MEXICANA.

Culms strigose below the nodes; panicles compact or if not the branches erect or nearly so; plants often bushy-branching but not sprawling with geniculate branchlets.

Callus hairs wanting; lemma nearly smooth, awnless. 27. M. GLABRIFLORA.

Callus hairs present; lemma pubescent below.

Panicles not compactly flowered; lemma with awn as much as 10 mm or more long (sometimes awnless); some of the blades 10 to 15 cm or more long. 28. M. SYLVATICA.

Panicles compactly flowered or, if not, lemma awnless; blades commonly less than 10 cm long, but sometimes longer.

Sheaths glabrous---------- 29. M. FOLIOSA.

Sheaths scabrous---------- 21. M. CALIFORNICA.

2b. Creeping rhizomes wanting, the culms tufted, usually erect (see also *M. uniflora*).

8a. Second glume 3-toothed (rarely not toothed in *M. filiculmis*).

Lemma 2.5 to 3 mm long; culms filiform, 10 to 20 cm tall. 17. M. FILICULMIS.

Lemma 4 mm long; culms stouter, 30 to 60 cm tall----- 34. M. MONTANA.

8b. Second glume usually acute or awned, sometimes erose-toothed, not distinctly 3-toothed.

9a. Panicle narrow or spikelike, the branches floriferous from the base or nearly so (see also *M. metcalfei*).

Lemma acuminate, mucronate or short-awned.

Blades involute.

Panicle elongate and spikelike---------- 55. M. RIGENS.

Panicle narrow but scarcely spikelike, the branches loosely flowered.

Blades mostly in a short basal cluster; panicle 5 to 8 cm. long. 33. M. JONESII.

Blades not in a short basal cluster; panicle 10 to 30 cm long. 45. M. DUBIA.

Blades flat, folded, or loosely involute.

Panicle more or less spikelike.

Culms delicate; ligule about 2 mm long---- 4. M. FILIFORMIS.

Culms wiry; ligule minute.

Panicle slender, rather loosely flowered-- 10. M. CUSPIDATA.

Panicle dense, interrupted, the branches closely flowered. 11. M. WRIGHTII.

Panicle narrow but not spikelike.

Lemma villous below---------- 54. M. EMERSLEYI.

Lemma glabrous or obscurely pubescent.

Lower sheaths compressed-keeled.

Glumes about as long as the floret-- 52. M. LINDHEIMERI.

Glumes distinctly shorter than the floret. 53. M. INVOLUTA.

Lower sheaths not compressed-------- 51. M. LONGILIGULA.

Lemma with an awn as much as 5 mm long.

Old sheaths becoming flat and more or less coiled at base of plant. 35. M. VIRESCENS.

Old sheaths not flat and coiled.
Lemma pilose on lower part.
Culms loosely tufted, hard and wiry at base; floret loosely villous below.
Glumes and floret about equal---------- 36. M. POLYCAULIS.
Glumes about half as long as floret---------- 37. M. ARSENEI.
Culms closely or somewhat loosely tufted, slender but not hard and wiry at base; floret densely pilose at base.
38. M. MONTICOLA.
Lemma scaberulous, not pilose.
Glumes less than 1 mm long---------- 39. M. PARVIGLUMIS.
Glumes about 2 mm long---------- 40. M. PAUCIFLORA.
9b. Panicle open, or at least loose, the branches naked at base (sometimes shortly so in *M. metcalfei*).
Plants widely spreading, much branched, wiry, the base knotty.
41. M. PORTERI.
Plants erect, not widely spreading and much branched.
Blades flat, short---------- 18. M. ARIZONICA.
Blades elongate or, if short, involute.
Blades short in a basal cluster, involute.
Panicle mostly less than 15 cm long; blades 1 to 3 cm long, curled or falcate---------- 42. M. TORREYI.
Panicle mostly more than 20 cm long; blades commonly 5 to 8 cm long---------- 43. M. ARENICOLA.
Blades elongate, flat or involute.
10a. Panicle usually not more than twice as long as wide at maturity, the branches and pedicels stiff; awn of lemma less than 5 mm long.
Plants with fibrous tuft at base; lemma awnless or with an awn as much as 2 mm long---------- 49. M. EXPANSA.
Plants without fibrous tuft at base; lemma with an awn 2 to 5 mm long---------- 50. M. REVERCHONI.
10b. Panicle elongate, at least 4 times as long as wide at maturity; awns of lemmas, or some of them, usually 10 mm long or more.
Panicle relatively dense, the branches short; pedicels mostly shorter than the spikelets---------- 47. M. METCALFEI.
Panicle loose, the capillary branches ascending to spreading.
Blades involute, subfiliform, scabrous; panicle pale or tawny.
44. M. SETIFOLIA.
Blades coarser, flat to involute; panicle purple (often tawny in *M. emersleyi*).
Panicle branches, or most of them, more than 10 cm long, the panicle diffuse at maturity-- 48. M. CAPILLARIS.
Panicle branches not more than 10 cm long, the panicle not diffuse.
Lower sheaths compressed-keeled; glumes as long as lemma or a little longer------ 54. M. EMERSLEYI.
Lower sheaths not compressed-keeled; glumes much shorter than lemma---------- 46. M. RIGIDA.

1. Muhlenbergia texána Buckl. (Fig. 732.) Annual; culms delicate, erect or decumbent at base, 10 to 20 cm tall; blades mostly less than 5 cm long, about 1 mm wide, scabrous; panicle oblong, more than half the entire height of the plant, open, the delicate branches ascending or spreading, 2 to 3 cm long; spikelets 1.5 to 2 mm long, the capillary pedicels longer than the spikelets; glumes acute, about two thirds as long as the lemma, sparsely hirsute; lemma minutely silky on midnerve and margins below, 2-lobed, the delicate awn 1 to 2 mm long. ⊙ —Open gravelly places, western Texas and New Mexico to northern Mexico.

2. Muhlenbergia microspérma (DC.) Kunth. LITTLESEED MUHLY. (Fig. 733.) Annual; culms densely tufted, branching and spreading at base, often purple, 10 to 30 cm tall; blades mostly less than 3 cm long, 1

to 2 mm wide, scabrous; panicles narrow, 5 to 15 cm long, the branches rather distant, ascending; spikelets on short thick pedicels; glumes broad, obtuse, subequal, less than 1 mm long; lemma narrow, 3 to 4 mm long, scabrous, the slender awn 1 to 3 cm long. ⊙ —Open dry ground, Arizona and southern California to Peru. Cleistogamous spikelets are developed at the base of lower sheaths, solitary or few in a fascicle in each axil, each spikelet included in an indurate thickened, tightly rolled narrowly conical reduced sheath, which readily disarticulates from the plant at maturity. The glumes are wanting and awn of lemma reduced, but the grain is larger than that of the spikelets in the terminal inflorescence, being about the same length (2 mm) but much thicker.

FIGURE 732.—*Muhlenbergia texana*. Plant, × 1; glumes and floret, × 10. (Pringle 399, Mex.)

3. Muhlenbergia depauperáta Scribn. (Fig. 734.) Annual; culms in dense tufts, 5 to 10 or rarely 15 cm tall, erect; blades scabrous, pubescent on the upper surface, mostly less than 3 cm long, about 1 mm wide; panicle narrow, loosely spikelike, usually more than half the entire length of the plant, the branches appressed; glumes narrow, scabrous, the first irregularly bidentate or entire, mostly 1 to 2 mm long, occasionally reduced, the second, a little longer; lemma narrow, terete, prominently 3-nerved, slightly pubescent along the internerves, about 4 mm long, the delicate awn straight, about 1 cm long. ⊙ —Open gravelly places, Colorado, New Mexico, and Arizona; Mexico.

FIGURE 733.—*Muhlenbergia microsperma*. Plant, × 1; glumes and floret, × 10. (Mearns 2780, Ariz.)

4. Muhlenbergia filifórmis (Thurb.) Rydb. PULL-UP MUHLY. (Fig. 735.) Annual, tufted, rather soft and lax, erect or somewhat spreading; culms filiform, usually 5 to 15 cm tall, sometimes as much as 30 cm; ligule about 2 mm long, blades flat, usually less than 3 cm long; panicle narrow, interrupted, few-flowered, usually less than 5 cm long; glumes ovate, 1 mm long; lemma lanceolate, acute, mucronate, 2 mm long, minutely pubescent, scaberulous at tip. ⊙ —Open

woods and mountain meadows, South Dakota and Kansas to British Columbia, south to New Mexico and California (fig. 736). A somewhat stouter form with thicker panicles has been called *M. simplex* Rydb.

5. Muhlenbergia répens (Presl) Hitchc. CREEPING MUHLY. (Fig. 737.) Perennial with widely creeping scaly rhizomes; culms decum-

FIGURE 734.—*Muhlenbergia depauperata.* Plant, × 1; glumes and floret, × 10. (Metcalfe 671, N. Mex.)

FIGURE 735.—*Muhlenbergia filiformis.* Plant, × 1; glumes and floret, × 10. (Nelson 4011, Wy.)

bent, branching, spreading, the flowering branches 5 to 20 cm long; blades mostly 1 to 2 cm long, flat or soon involute; panicle narrow, 1 to 4 cm long, sometimes longer, interrupted; spikelets about 3 mm long; glumes more than half as long as the lemma or a little more, acutish; lemma narrowed to a more or less apiculate summit, minutely roughened, usually darker than the glumes, the lateral nerves obscure. ♃ —Dry rocky or sandy open ground, Texas to Arizona; known in Mexico only from the type collection.

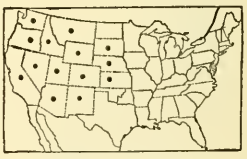

FIGURE 736.—Distribution of *Muhlenbergia filiformis.*

6. Muhlenbergia útilis (Torr.) Hitchc. APAREJO GRASS. (Fig. 738.) Similar to *M. repens;* usually more delicate with finer leaves; spikelets about 2 mm long, less pointed, the glumes sometimes less than half as long as the paler lemma. ♃ (*Sporobolus utilis* Scribn.) —Wet places, marshy soil, and along ditches and streams, Texas, Arizona, southern California, Nevada, and Mexico. Used for stuffing pack saddles.

7. Muhlenbergia squarrósa (Trin.) Rydb. MAT MUHLY. (Fig. 739.) Perennial from numerous hard creeping rhizomes; culms wiry, nodulose-roughened, erect or decumbent at base, from 5 cm to as much as 60 cm long; ligule 2 to 3 mm long; blades usually involute, 1 to 5 cm long, rarely longer; panicle narrow, interrupted, or sometimes rather close and spikelike, 2 to 10 cm long; spikelets 2 to 3 mm long, the glumes about half as long, ovate; lemma lanceolate, acute, mucronate. 2l —Dry or moist open often alkaline soil, New Brunswick and Maine to Alberta, south to South Dakota and in the mountains to New Mexico, through eastern Washington to California, Arizona, and southern Mexico (fig. 740). The typical form (*Vilfa squarrosa* Trin.; *Vilfa depauperata* Torr.; *Sporobolus depauperatus* Scribn., not *Muhlenbergia depauperata* Scribn.) is rather stout, decumbent or somewhat spreading, Wyoming to Washington and California; a common form

FIGURE 737.—*Muhlenbergia repens.* Plant, × 1; glumes and floret, × 10. (Silveus 831, Tex.)

FIGURE 738.—*Muhlenbergia utilis.* Plant, × 1; glumes and floret, × 10. (Lindheimer 559, Tex.)

(*Vilfa richardsonis* Trin.; *Sporobolus richardsonis* Merr.) has slender erect culms. These forms intergrade.

8. Muhlenbergia thurbéri Rydb. (Fig. 741.) Perennial, with creeping rhizomes; culms slender, 10 to 20 cm tall, branched at base, the branches erect, tufted, the tufts on branches of the rhizome; sheaths glabrous; blades involute, slender, mostly 1 to 3 cm long; panicle pale, narrow, slender, 3 to 7 cm long, the branches short, appressed, few-flowered; spikelets 3.5 to 4 mm long; glumes a little

shorter than the lemma, acute; lemma and palea villous on lower half, the lemma mucronate to short-awned. ♃ —Dry hills, Texas, New Mexico, Nevada, Arizona; rare (fig. 742).

9. Muhlenbergia curtifólia Scribn. (Fig. 743.) Perennial, with creeping rhizomes; culms 10 to 20 cm tall, loosely tufted, few from

FIGURE 739.—*Muhlenbergia squarrosa.* Plant, × ½; glumes and lemma, × 10. (Jones 5743, Utah.)

the branches of the rhizome; sheaths glabrous or pubescent; blades 1 to 2.5 cm long, 2 mm wide or less, rigidly spreading, pungently pointed, more or less pubescent; panicle 4 to 8 cm long, slender, the branches appressed; spikelets 3 to 3.5 mm long; glumes acute, a little shorter than the floret; lemma and palea villous on the lower half, scabrous above, tapering into an awn 1 to 3 mm long. ♃ —Rocky soil, southern Utah, southern Nevada, and northern Arizona.

FIGURE 740.—Distribution of *Muhlenbergia squarrosa.*

10. Muhlenbergia cuspidáta (Torr.) Rydb. PLAINS MUHLY. (Fig. 744.) Culms slender, wiry, 20 to 40 cm tall, erect, in dense tufts with hard bulblike scaly bases; ligule minute; blades flat or loosely involute, erect or ascending, 1 to 2 mm wide; panicle narrow, somewhat spikelike, 5 to 10 cm long, the short branches appressed; spikelets about 3 mm long; glumes subequal, acuminate-cuspidate, about two-thirds as long as the spikelet; lemma acuminate-cuspi-

date, minutely pubescent. 2l —Prairies and gravelly or stony slopes, Michigan, Wisconsin to Alberta, south to Ohio and New Mexico (fig. 745).

11. Muhlenbergia wrightii Vasey. SPIKE MUHLY. (Fig. 746.) Culms closely tufted from a hard crown, erect, wiry, 30 to 60 cm tall; sheaths compressed-keeled; ligule 1 to 2 mm long, sometimes longer; blades flat, 1 to 3 mm wide; panicle spikelike, interrupted below, 5 to 10 cm long; spikelets about 2.5 mm long, the glumes rather thin, mostly about half as long as the spikelet, broad at base, tapering to an awn point; lemma glabrous, acuminate, awn-tipped. 2l — Plains and open slopes at medium altitudes, Colorado, Utah, New Mexico, Arizona, and northern Mexico (fig. 747).

12. Muhlenbergia arenácea (Buckl.) Hitchc. (Fig. 748.) Perennial, with creeping rhizomes; culms tufted from the branches of the

FIGURE 741.—*Muhlenbergia thurberi.* Plant, × 1; glumes and floret, × 10. (Standley 7345, Ariz.)

FIGURE 743.—*Muhlenbergia curtifolia.* Plant, × 1 glumes and floret, × 10. (Type.)

rhizomes, sometimes decumbent at base, 10 to 20 cm tall; ligule prominent, decurrent, 1 to 2 mm long, the margins usually split away, forming an erect auricle at each side; blades flat, wavy, mostly 1 to 3 cm long, about 1 mm wide, sharp-pointed, the margins and midnerve white and cartilaginous; panicle diffuse, 7 to 12 cm long, about as broad, the branches and pedicels capillary; spikelets about 2 mm long, rarely 2-flowered; the glumes about half as long, abruptly apiculate or subacute; lemma glabrous, abruptly mucronate. 2l (*Sporobolus auriculatus* Vasey.)—Low places in mesas, Texas to Arizona and Sonora. This species and the next three are placed in *Muhlenbergia* because of the 3-nerved mucronate lemma. The

FIGURE 742.—Distribution of *Muhlenbergia thurberi.*

FIGURE 744.—*Muhlenbergia cuspidata*. Plant, × 1; glumes and floret, × 10. (Cratty, Iowa.)

caryopsis does not fall from the lemma and palea as in most species of *Sporobolus*, nor can the pericarp be separated from the grain by moistening it.

13. Muhlenbergia asperifólia (Nees and Mey.) Parodi. SCRATCHGRASS. (Fig. 749.) Perennial, pale or glaucous, with slender scaly rhizomes; culms branching at base, spreading, slender, compressed, 10 to 40 cm tall, the branches ascending or erect; sheaths somewhat compressed-keeled, usually overlapping; ligule minute, erose-toothed; blades flat, crowded, scabrous, mostly 2 to 5 cm long, 1 to 2 mm wide; panicle diffuse, 5 to 15 cm long, about as wide, the capillary scabrous branches finally widely spreading, the panicle at maturity breaking away; spikelets 1.5 to 2 mm long, occasionally 2-flowered, the pedicels capillary; glumes acute, from half to nearly as long as the spikelet; lemma thin, broad, minutely mucronate from an obtuse apex. ♃ (*Sporobolus asperifolius* Nees and Mey.)—Damp or marshy, often alkaline soil, along irrigation ditches and banks of streams, Illinois and Alberta to British Columbia, south to Texas, California, and Mexico (fig. 750); southern South America. The caryopsis is frequently affected by a fungus (*Tilletia asperifolia* Ell. and Everh.) which produces a large globular body.

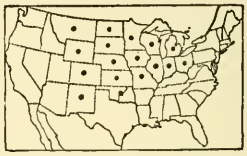

FIGURE 745.—Distribution of *Muhlenbergia cuspidata*.

FIGURE 746.—*Muhlenbergia wrightii*. Plant, × 1; glumes and floret, × 10. (Standley 8249, N.Mex.)

14. Muhlenbergia torreyána (Schult.) Hitchc. (Fig. 751.) Perennial, strongly compressed at base, with short very scaly rhizomes; culms simple, or sparingly branching at base, erect, 30 to 60 cm tall; blades elongate, rather firm, flat or folded, 1 to 3

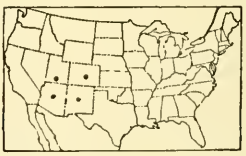

FIGURE 747.—Distribution of *Muhlenbergia wrightii*.

mm wide; panicle oblong, open, 10 to 20 cm long, the capillary branches and pedicels ascending; spikelets about 2 mm long, the glumes subequal, slightly shorter; lemma and palea minutely scaberulous-puberulent. ♃ (*Sporobolus compressus* Kunth; *S. torreyanus* Nash.)—Moist pine barrens and meadows, New Jersey and Delaware; Georgia (Sumter County).

15. Muhlenbergia uniflóra (Muhl.) Fernald. (Fig. 752.) Perennial, but often appearing like an annual, tufted, often with decumbent

FIGURE 748.—*Muhlenbergia arenacea*. Plant, × 1; glumes and floret, × 10. (Tracy 7909, Tex.)

bases; culms slender, erect, 20 to 40 cm tall, the base and lower sheaths compressed; blades flat, crowded along the lower part of the culm, about 1 mm wide; panicle loose, open, oblong, 7 to 20 cm long, 2 to 4 cm wide, the branches and pedicels capillary; spikelets dark purplish, about 1.5 mm long, rarely 2-flowered; glumes scarcely half as long as the spikelet, subacute; lemma faintly 3-nerved, acutish. ♃ (*Sporo-*

bolus serotinus A. Gray; *S. uniflorus* Scribn. and Merr.)—Bogs and wet meadows, Newfoundland to Michigan and New Jersey (fig. 753).

16. Muhlenbergia púngens Thurb. (Fig. 754.) Perennial, with

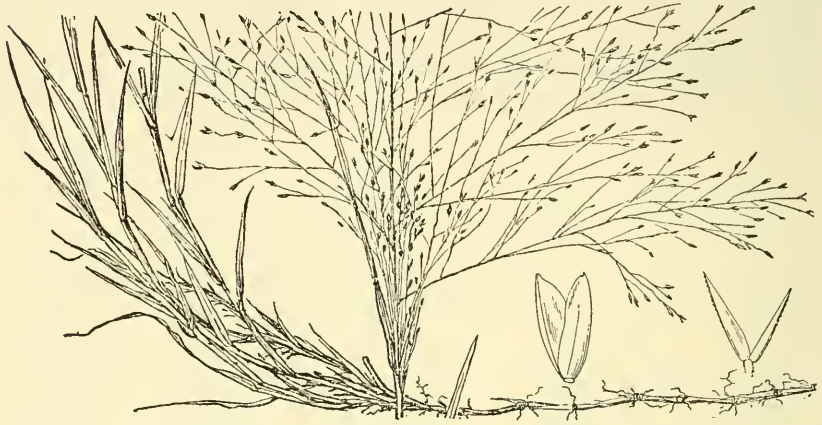

FIGURE 749.—*Muhlenbergia asperifolia.* Plant, × 1; glumes and floret, × 10. (Griffiths 212, S.Dak.)

strong creeping rhizomes; culms tufted, erect from a decumbent leafy base, 20 to 40 cm tall, sometimes taller; blades short, involute, sharp-pointed; panicle long-exserted, open, oblong, 5 to 15 cm long; the main branches 3 to 5, these dividing into fascicles of capillary finally spreading or divaricate very scabrous branchlets; spikelets purple to brownish, 4 to 5 mm long, the glumes about one third as long, scabrous, often erose or toothed, the midnerve extending into a short awn; lemma terete, tapering into an awn about 1 mm long; palea about as long as the lemma, the keels awn-tipped. 2$\frac{1}{4}$ —Dry hills and sandy plains, South Dakota, Colorado, and Utah to New Mexico and Arizona (fig. 755).

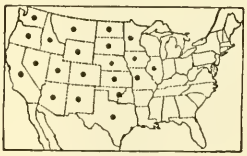

FIGURE 750.—Distribution of *Muhlenbergia asperifolia.*

FIGURE 751.—*Muhlenbergia torreyana.* Plant, × 1; glumes and floret, × 10. (Vasey, N.J.)

17. Muhlenbergia filicúlmis Vasey. SLIMSTEM MUHLY. (Fig. 756.) Culms densely tufted, erect, filiform, 10 to 20 cm tall, the leaves in a short basal cluster; ligule prominent; blades involute, filiform, mostly less than 5 cm long; panicle slender, the branches erect, mostly 2 to 5 cm long, sometimes as much as 10 cm; spikelets about

2.5 to 3 mm long, the glumes about half as long, awn-tipped, the first rather narrow, acuminate, the second broader, 3-nerved, sharply 3-toothed, rarely entire or erose only; lemma pubescent on the lower half, tapering to an awned tip. ♃ —Open sandy or rocky soil, 2,000 to 3,000 m altitude, Wyoming, Colorado, and New Mexico.

18. Muhlenbergia arizónica Scribn. (Fig. 757.) Perennial, in close tufts; culms slender, erect or decumbent at base, 15 to 40 cm tall; sheaths keeled; ligule thin, 1 to 2 mm long, decurrent; blades flat or folded, mostly less than 5 cm long, 1 to 2 mm wide, the margins and midnerve white, cartilaginous; panicle open, 5 to 12 cm long, 4 to 8 cm wide, the branches capillary, compound; spikelets long-pedicellate, about 3 mm long, the glumes about one third as long, ovate, subacute; lemma narrowly lanceolate, minutely pubescent along the midnerve and margins below, the awn about 1 mm long, from a minutely notched apex. ♃ — Stony hills, southern Arizona and northwestern Mexico.

FIGURE 752.—*Muhlenbergia uniflora*. Plant, × 1; glumes and floret, × 10. (Chamberlain 147, Maine.)

19. Muhlenbergia dumósa Scribn. (Fig. 758.) Perennial, with short, stout creeping scaly rhizomes; culms robust, solid, thick, and scaly at base (here as much as 6 mm thick), the main culm erect or leaning, 1 to 3 m tall, the lower part clothed with bladeless sheaths, freely branching at the middle and upper nodes, the branches numerous, fascicled, spreading, decompound, the ultimate branchlets filiform; blades flat or soon involute, smooth, those of the branches mostly less than 5 cm long and 1 mm wide; panicles numerous on the branches, commonly exceeded by the leaves, 1 to 3 cm long, narrow, somewhat flexuous; spikelets, excluding the awn, about 3 mm long, the glumes scarcely half as long, thin, pale with a green midnerve, usually minutely awn-tipped; lemma narrow, pubescent about the base and margin, pale with green nerves, the awn from the slightly notched apex, flexuous, 3 to 5 mm long. ♃ —Canyons and valley flats, southern Arizona to Jalisco Mexico. Has the aspect of a small bamboo.

FIGURE 753.—Distribution of *Muhlenbergia uniflora*.

20. Muhlenbergia glaúca (Nees) Mez. (Fig. 759.) Perennial, from a slender creeping branching woody rhizome; culms slender, wiry, erect or ascending, 30 to 60 cm tall, branching from the lower nodes; blades flat to subinvolute, mostly 5 to 10 cm long, 1 to 2 mm wide; panicle 5 to 12 cm long, narrow, contracted, interrupted, the branches short, appressed; spikelets 3 to 4 mm long, the glumes nearly as long, acuminate; lemma sparsely pilose on the lower part, acuminate into an awn usually 1 to 3 mm (rarely as much as 6 mm) long. ♃ (*M. lemmoni* Scribn.)—Deserts, western Texas to southern California (Jamacha) and northern Mexico (fig. 760).

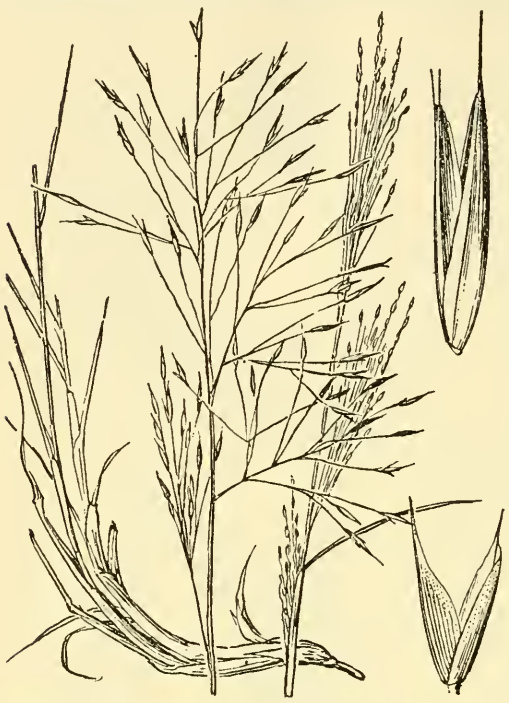

FIGURE 754.—*Muhlenbergia pungens*. Plant, × 1; glumes and floret, × 10. (Jones 6046, Utah.)

21. Muhlenbergia califórnica Vasey. (Fig. 761.) Perennial, pale, leafy, the base more or less creeping and rhizomatous; culms ascending, somewhat woody below, 30 to 60 cm tall, branching below; sheaths scaberulous; blades flat, 4 to 6 mm wide, scabrous, usually short; panicle narrow, dense but interrupted, 7 to 15 cm long; spikelets 3 to 4 mm long, the glumes slightly shorter, scabrous, acuminate, awn-tipped; lemma scabrous, acuminate, awn-tipped, with sparse callus hairs about half as long as the lemma. ♃ —Stream borders and gullies, foothills and mountain slopes up to 2,000 m, confined to southern California.

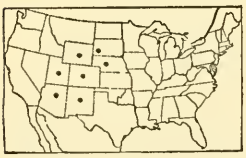

FIGURE 755.—Distribution of *Muhlenbergia pungens*.

22. Muhlenbergia sobolífera (Muhl.) Trin. (Fig. 762, *A*.) Perennial, with numerous creeping scaly rhizomes 2 to 3 mm thick; culms erect, slender, solitary or few in a tuft, glabrous, 60 to 100 cm tall, sparingly branching, the branches erect; blades flat, spreading, scabrous, those of the main culm 5 to 15 cm long, 3 to 8 mm wide, occasionally larger, at time of flowering aggregate along the middle part of the culm; panicles slender, somewhat nodding, mostly 5 to 15 cm long, the distant branches appressed, floriferous from base, over-lapping or the lower more distant; spikelets mostly 2 to 2.5 mm long, the glumes about two thirds as long, abruptly acuminate or awn-tipped; lemma elliptic, bluntish, pubescent on the lower part, usually apiculate. ♃ —Dry rocky woods and cliffs, New Hamp-

FIGURE 756.—*Muhlenbergia filiculmis*. Panicle × 1; glumes and floret, × 10. (Type.)

shire to Iowa, south to Virginia, Tennessee, and Texas (fig. 763).

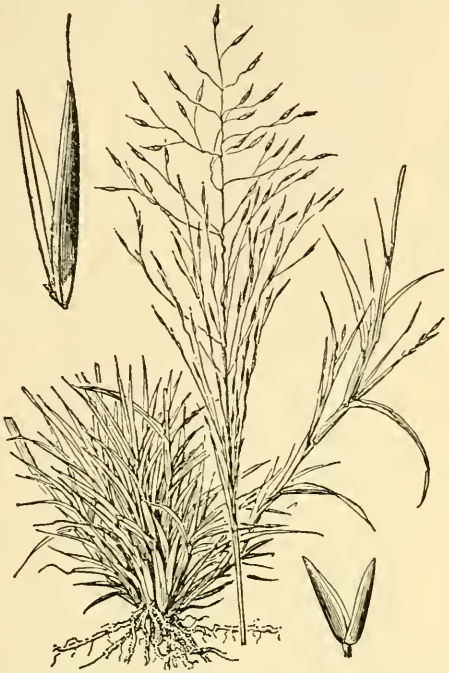

FIGURE 757.—*Muhlenbergia arizonica.* Plant, × 1; glumes and floret, × 10. (Griffiths 3368, Ariz.)

FIGURE 759.—*Muhlenbergia glauca.* Plant, × 1; glumes and floret, × 10. (Nealley 726, Tex.)

MUHLENBERGIA SOBOLIFERA var. SETÍGERA Scribn. (Fig. 762, *B.*) Branching more freely in the later stages; lemma with an awn 1 to 3 mm long. 2↓ — Dry woods, Arkansas and Texas.

FIGURE 758.—*Muhlenbergia dumosa.* Plant, × 1; glumes and floret, × 10. (Pringle, Ariz.)

23. Muhlenbergia tenuiflóra (Willd.) B.S.P. (Fig. 764.) Similar to *M. sobolifera* in habit; culms often more robust; blades mostly 10 to 18 cm long and 6 to 10 mm wide; panicles on the average longer; culms retrorsely puberulent at least around the nodes; sheaths puberulent or scaberulous toward the summit;

FIGURE 760.—Distribution of *Muhlenbergia glauca.*

spikelets (excluding the awns) 3 to 4 mm long, the glumes about half as long, broad at base, abruptly acuminate, scaberulous; lemma narrow, pubescent toward the base, tapering into a slender straight awn 3 to 10 mm long. ♃ —Rocky woods, Ontario and Vermont to Iowa, south to Virginia, Tennessee, and Oklahoma (fig. 765).

FIGURE 761.—*Muhlenbergia californica.* Plant, × 1; glumes and floret, × 10. (Parish 2113, Calif.)

24. Muhlenbergia brachyphýlla Bush. (Fig. 766.) Perennial, with numerous slender scaly rhizomes; culms slender, suberect, freely branching at the middle nodes, the branches lax, glabrous or obscurely scabrous below the nodes; blades flat, spreading, scaberulous, mostly 7 to 15 cm long and 3 to 5 mm wide; panicles on filiform peduncles, very slender, lax, relatively few-flowered, mostly 8 to 15 cm long; spikelets, excluding the awn, about 3 mm long, the glumes about two-thirds as long, awn-tipped; lemma minutely pubescent toward the base, tapering into a slender awn 3 to 6 mm long, rarely shorter. ♃ —Low woods, Indiana to Nebraska, south to Texas (fig. 767). Resembling *M. tenuiflora* but with numerous filiform branches and more slender panicles.

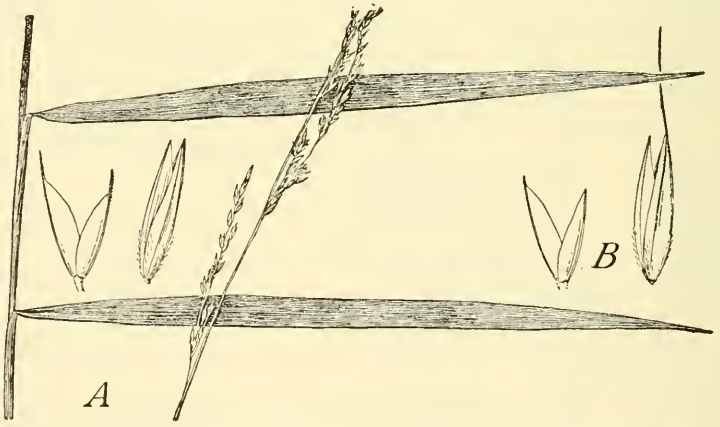

FIGURE 762.—*A*, *Muhlenbergia sobolifera.* Plant, × 1; glumes and floret, × 10. (Metcalf 1589, N.Y.) *B*, Var. *setigera*, × 10. (Reverchon 1049, Tex.)

25. Muhlenbergia racemósa (Michx.) B.S.P. MARSH MUHLY. (Fig. 768.) Perennial, from stout creeping scaly rhizomes; culms erect or reclining, 50 to 100 cm tall, or even more, slightly roughened

below the nodes, simple or sparingly branching, the branches erect; sheaths smooth, keeled; blades flat, mostly appressed, scabrous, 5 to 10 cm long, 2 to 5 mm wide; panicle narrow, compact or lobed, bristly, 3 to 10 cm long; spikelets 4 to 6 mm long, the narrow subequal glumes stiffly awn-tipped; lemma acuminate, about 3 mm long, pilose on lower part. ♃ —Moist meadows and low ground, Newfoundland to British Columbia, south to Maryland, Kentucky, Oklahoma, and Arizona (fig. 769).

FIGURE 763.—Distribution of *Muhlenbergia sobolifera.*

26. Muhlenbergia mexicána (L.) Trin. WIRE-STEM MUHLY. (Fig. 770.) Perennial, with creeping scaly rhizomes; culms decumbent and rooting at base, freely branching from all the nodes, the branches ascending, the plants becoming top-heavy and bushy, the culms glabrous below the nodes; blades flat, scabrous, usually less than 10 cm long, but sometimes as much as 15 cm, 3 to 7 mm wide; panicles numerous, short-exserted or partly included, terminal and axillary, the larger as much as 10 cm long, the axillary shorter, narrow, the branches ascending, mostly densely flowered from the base; glumes 2 to 3 mm long or slightly longer, narrow, tapering into an awn-tip; lemma about equaling the glumes, acuminate, short-pilose at base. ♃ —Thickets, low ground, and waste places, New Brunswick to North Dakota, south to the mountains of Georgia and Texas (fig. 771). This species does not grow in Mexico. It was originally described from a garden specimen cultivated by Linnaeus in his Upsala Garden and erroneously credited to Mexico. MUHLENBERGIA MEXICANA var. COMMUTÁTA Scribn. Lemmas awned, the awns 4 to 10 mm long. ♃ —Quebec and Maine to South Dakota, south to Virginia and Missouri; less common than the species. May be distinguished from *M. foliosa* var. *setiglumis*, which it sometimes resembles, by the culms smooth below the nodes and the included or scarcely exserted panicles.

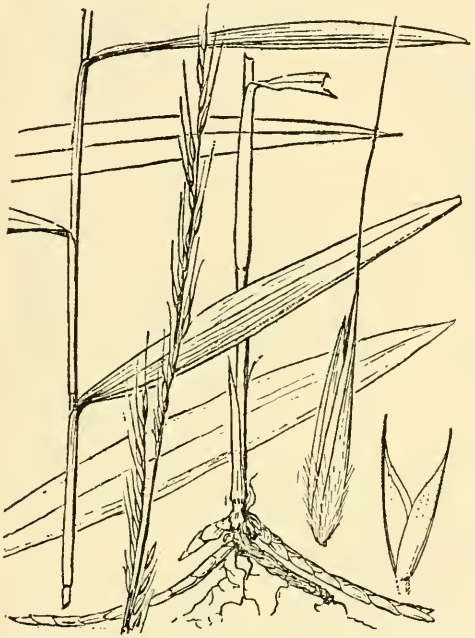

FIGURE 764.—*Muhlenbergia tenuiflora.* Plant, × 1; glumes and floret, × 10. (Mosley, Ohio.)

FIGURE 765.—Distribution of *Muhlenbergia tenuiflora.*

27. Muhlenbergia glabriflóra Scribn. (Fig. 772.) In habit resembling *M. mexicana*, freely branching; culms scaberulous below the

nodes as in *M. sylvatica;* blades numerous, short, narrow, appressed; panicles on the average shorter and narrower than in *M. mexicana;* spikelets about as in *M. mexicana* but the lemma glabrous. 2↓ —Low woods, Maryland, Indiana, Illinois, Missouri, and Texas (fig. 773).

FIGURE 766.—*Muhlenbergia brachyphylla.* Plant, × 1; glumes and floret, × 10. (V. H. Chase 3759, Ill.)

28. Muhlenbergia sylvática Torr. (Fig. 774.) Resembling *M. mexicana* in habit, the branches

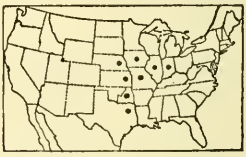

FIGURE 767.—Distribution of *Muhlenbergia brachyphylla.*

usually more slender and lax; culms retrorsely scaberulous below the nodes; panicles slender, nodding, the branches distant, appressed, overlapping, or the lower scarcely so; glumes lanceolate, rather abruptly acuminate or awn-pointed, about 2 mm long; lemma a little longer than the glumes, somewhat pilose below, tapering into an awn 5 to 10 mm long. 2↓ (*M. umbrosa* Scribn.)—Moist woods and thickets, Maine to South Dakota, south to Alabama and Texas; Arizona (fig. 775). Awns sometimes reduced or wanting.

FIGURE 768.—*Muhlenbergia racemosa.* Plant, × 1; glumes and floret, × 10. (Macoun 26241, Ont.)

29. Muhlenbergia foliósa (Roem. and Schult.) Trin. (Fig. 776.) Resembling *M. mexicana* and *M. sylvatica* in habit; culms scaberulous below the nodes; panicles mostly exserted, often rather long-exserted, narrow, of numerous short appressed densely flowered somewhat aggregate branches; spikelets 2 to 3 mm long; glumes narrow, attenuate into a short awn, about as long as the acuminate to awn-tipped lemma, the lemma long-pilose below. 2↓ —Moist thickets, low woods,

FIGURE 769.—Distribution of *Muhlenbergia racemosa.*

and low open ground, Quebec and Maine to Montana, south to North Carolina, Indiana, Kansas, New Mexico, and Arizona (fig. 777). MUHLENBERGIA FOLIOSA var. SETIGLÚMIS (S. Wats.) Scribn. Lemmas awned, the awn 4 to 10 mm long. ♃ —About the same range as the species; also Washington to northern California and Nevada.

FIGURE 770.—*Muhlenbergia mexicana.* Plant, × 1; glumes and floret, × 10. (V. H. Chase 1166, Ill.)

30. Muhlenbergia schrebéri Gmel. NIMBLEWILL. (Fig. 778, *A*.) Culms slender, branching, spreading and decumbent at base, usually rooting at the lower nodes, but not forming definite creeping rhizomes, the flowering branches ascending, 10 to 30 cm long; blades flat, mostly less than 5 cm long, and 2 to 4 mm wide; panicles terminal and axillary, slender, loosely flowered, lax, nodding, 5 to 15 cm long; glumes minute, the first often obsolete, the second rounded, 0.1 to 0.2 mm long; lemma narrow, somewhat pubescent around the base, the body about 2 mm long, the slender awn 2 to 5 mm long. ♃ —Damp shady places, New Hampshire to Wisconsin and eastern Nebraska, south to Florida and Texas; eastern Mexico (fig. 779). In spring and early summer the culms are short and erect with spreading blades, the plants being very different in appearance from the flowering phase of fall. MUHLENBERGIA SCHREBERI var. PALÚSTRIS (Scribn.) Scribn. Glumes developed, as much as 1 mm long. ♃ —Washington, D.C.

FIGURE 771.—Distribution of *Muhlenbergia mexicana.*

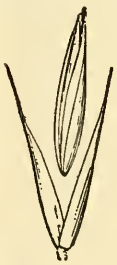

FIGURE 772.—*Muhlenbergia glabriflora,* × 10. (Type.)

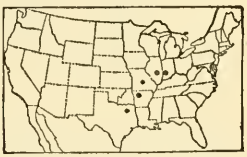

FIGURE 773.—Distribution of *Muhlenbergia glabriflora.*

31. Muhlenbergia curtisetósa (Scribn.) Bush. (Fig. 778, *B*.) A little-known form, differing from *M. schreberi* in having stouter culms, coarser panicles, the glumes evident, rarely as much as 2 mm long, the lemma 2.5 to 3 mm long, the awn 1 to 2 mm long. ♃ — Illinois (Clinton), Missouri (Eagle Rock). It may be a hybrid.

32. Muhlenbergia andína (Nutt.) Hitchc. FOXTAIL MUHLY. (Fig. 780.) Perennial, with numerous scaly rhizomes; culms erect or some-

times spreading, scabrous-puberulent below the nodes and the panicle, 50 to 100 cm tall; sheaths smooth or slightly scabrous, keeled; ligule 1 mm long, membranaceous, short-ciliate; blades flat, 2 to 6 mm wide, scabrous; panicle narrow, spikelike, usually more or less lobed or interrupted, grayish, silky, often purple-tinged, 7 to 15 cm long; glumes narrow, acuminate, ciliate-scabrous on the keels, 3 to 4 mm long; lemma 3 mm long, tapering into a capillary awn 4 to 8 mm long, the hairs at base of floret copious, nearly as long as the body of the lemma. 2↓ (*M. comata* Benth.)—Meadows, moist thickets, gravelly river beds, and open ground, at medium altitudes, Montana to eastern Washington, south to New Mexico and central California (fig. 781).

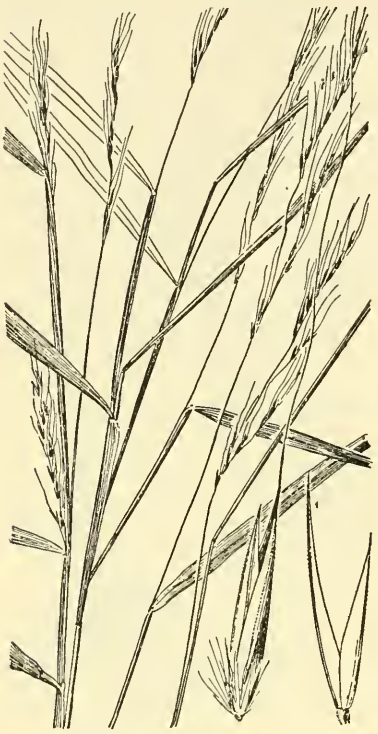

FIGURE 774.—*Muhlenbergia sylvatica*. Plant, × 1; glumes and floret, × 10. (Conant, Mass.)

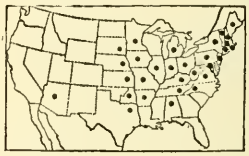

FIGURE 775.—Distribution of *Muhlenbergia sylvatica*.

33. Muhlenbergia jonésii (Vasey) Hitchc. (Fig. 782.) Perennial, closely tufted; culms erect, 20 to 40 cm tall; leaves mostly basal, the numerous lower sheaths finally flattened and loose; ligule 2 to 4 mm long; blades subfiliform, involute, scabrous; panicle narrow, 5 to 8 cm long, the branches ascending, rather loosely flowered; spikelets 3 to 4 mm long; glumes broad, scabrous-puberulent, about one-third as long as the spikelet, obtuse, often erose; lemma obscurely pubescent below, tapering to an acuminate or awned tip. 2↓ —Open ground, northeastern California.

FIGURE 776.—*Muhlenbergia foliosa*. Plant, × 1; glumes and floret, × 10. (Deam 19225, Ind.)

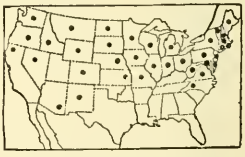

FIGURE 777.—Distribution of *Muhlenbergia foliosa*.

34. Muhlenbergia montána (Nutt.) Hitchc. MOUNTAIN MUHLY. (Fig. 783.) Perennial; culms densely tufted, erect,

30 to 60 cm tall; sheaths glabrous, mostly basal, becoming flat and loose; blades flat to involute, 1 to 2 mm wide; panicle narrow, rather loose, 5 to 15 cm long, the branches ascending or appressed, floriferous from base; first glume acute, 1.5 mm long, the second longer, broader, 3-nerved, 3-toothed; lemma about 4 mm long, pilose below, scaberulous above, the awn slender, flexuous, 1 to 1.5 cm long, sometimes shorter. 2 (*M. trifida* Hack., *M. gracilis* of authors, not Kunth.)—Canyons, mesas, and rocky hills, 2,000 to 3,000 meters, Montana to Utah and central California, south to western Texas and southern Mexico (fig. 784).

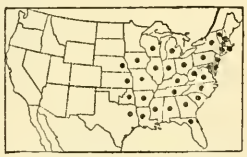

FIGURE 779.—Distribution of *Muhlenbergia schreberi*.

FIGURE 778.—*A*, *Muhlenbergia schreberi*. Plant, × ½; glumes and floret, × 10. (Curtiss 3400, Tenn.) *B*, *M. curtisetosa*. Glumes and floret, × 10. (Wolf 30, Ill.)

35. Muhlenbergia viréscens (H.B.K.) Kunth. SCREWLEAF MUHLY. (Fig. 785.) Perennial; culms densely tufted, erect, 40 to 60 cm tall, the old basal sheaths flattened and more or less coiled; ligule, except the margin, delicate, 3 to 10 mm long; blades flat or those of the innovations involute, mostly elongate and flexuous; panicle narrow but rather loose, 5 to 10 cm long, the branches erect; spikelets, excluding awns, about 5 mm long, the glumes slightly shorter, acute, the second 3-nerved; lemma and palea pubescent on the lower half, the lemma tapering into a slender flexuous awn 1 to 1.5 cm long. 2 —Can

yons, rocky hills, and mesas, New Mexico and Arizona to central Mexico.

FIGURE 780.—*Muhlenbergia andina.* Plant, × 1; glumes and floret, × 10. (Elmer 558, Wash.)

36. Muhlenbergia polycaúlis Scribn. (Fig. 786.) Perennial, from a firm crown; culms numerous, wiry, decumbent and scaly at base, 30 to 50 cm tall; blades

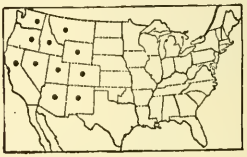

FIGURE 781.—Distribution of *Muhlenbergia andina.*

mostly flat and less than 5 cm long, about 1 mm wide; panicle narrow, contracted, interrupted, 3 to 8 cm long; spikelets, excluding awns, 2.5 to 3 mm long, the glumes a little shorter, tapering to slender awn-tips; lemma and palea loosely villous below, the lemma tapering into a delicate awn 1 to 2 cm long. 2↓ — Shaded ledges and grassy slopes, western Texas; southern Arizona to central Mexico.

37. Muhlenbergia arsénei Hitchc. (Fig. 787.) Perennial, without rhizomes but the spreading base sometimes rhizomatous in appearance, loosely tufted; culms wiry, 10 to 30 cm tall, branched below, the branches erect; leaves crowded toward the base, the blades slender, involute, sharp-pointed, 1 to 3 cm long; panicle narrow, rather loose, purplish, 2 to 10 cm long, the branches ascending, floriferous from base; spikelets, excluding the awns, 4 to 5 mm long, the glumes shorter, acute or subacute, awnless; lemma sparsely pubescent below, tapering into a flexuous awn 6 to 10 mm long. 2↓ —Arid slopes, northern New Mexico and southeastern Utah.

FIGURE 782.—*Muhlenbergia jonesii.* Plant, × 1; glumes and floret, × 10. (Austin 1230, Calif.)

38. Muhlenbergia montícola Buckl. MESA MUHLY. (Fig. 788.) Perennial; culms tufted, slender, erect or decumbent at base, 30 to 50 cm tall, branching at the lower and middle nodes, leafy throughout; blades 3 to 7 cm long, narrow, flat, or soon involute; panicle soft,

narrow, contracted, 5 to 10, sometimes to 15 cm long, the branches appressed or slightly spreading; spikelets, excluding awns, about 3 mm long, the glumes about two-thirds as long, subacute to obtuse and erose at tip; lemma pubescent at base and on lower half of margin, tapering into a delicate flexuous awn 1 to 2 cm long. ♃ —Rocky hills and canyons, western Texas to Arizona and central Mexico.

FIGURE 783.—*Muhlenbergia montana*. Plant, × 1; glumes and floret, × 10. (Patterson 156, Colo.)

39. Muhlenbergia parviglúmis Vasey. (Fig. 789.) Perennial, with the habit of *M. monticola;* blades on the average somewhat longer, 1 to 3 mm wide; spikelets as in *M. monticola*, but the glumes minute, erose, subacute to truncate; lemma scaberulous only, tapering into a delicate awn 2 to 4 cm long. ♃ —Canyons, Texas and northern Mexico; Cuba.

40. Muhlenbergia pauciflóra Buckl. NEW MEXICAN MUHLY. (Fig. 790.) Perennial; culms loosely tufted, wiry, erect, branching at the lower nodes, 30 to 50 cm tall; blades 1 mm wide or less; panicle narrow, contracted, interrupted, 5 to 10 cm long, the branches erect or ascending; spikelets, excluding awn, about 4 mm long, the glumes about half as long, acuminate to awn-tipped; lemma scaberulous only, tapering into a slender flexuous awn, 5 to 12 mm long. ♃ — Rocky hills and canyons, western Texas to Colorado and Arizona, south to northern Mexico (fig. 791).

FIGURE 784.—Distribution of *Muhlenbergia montana*.

FIGURE 785.—*Muhlenbergia virescens*. Plant, × 1; glumes and floret, × 10. (Palmer 565, Ariz.)

41. Muhlenbergia portéri Scribn. BUSH MUHLY. (Fig. 792.) Perennial; culms woody or persistent at base, numerous, wiry, widely spreading or ascending through bushes, scaberulous, mostly branching from all the nodes, 30 to 100 cm tall or more; sheaths

smooth, spreading away from the branches, the prophyllum conspicuous; blades mostly about 1 mm wide, flat, 2 to 5 cm long, early deciduous from the sheaths; panicle 5 to 10 cm long, open, the slender branches and branchlets brittle, widely spreading, bearing rather few long-pedicled spikelets; glumes narrow, acuminate, slightly unequal, the second about 2 mm long; lemma purple, acuminate, sparsely pubescent, 3 to 4 mm long, with a delicate awn about 5 to 8 mm long. 2‡ —Dry mesas and hills, canyons, and rocky deserts, western Texas to Colorado, Nevada, and southern California, south

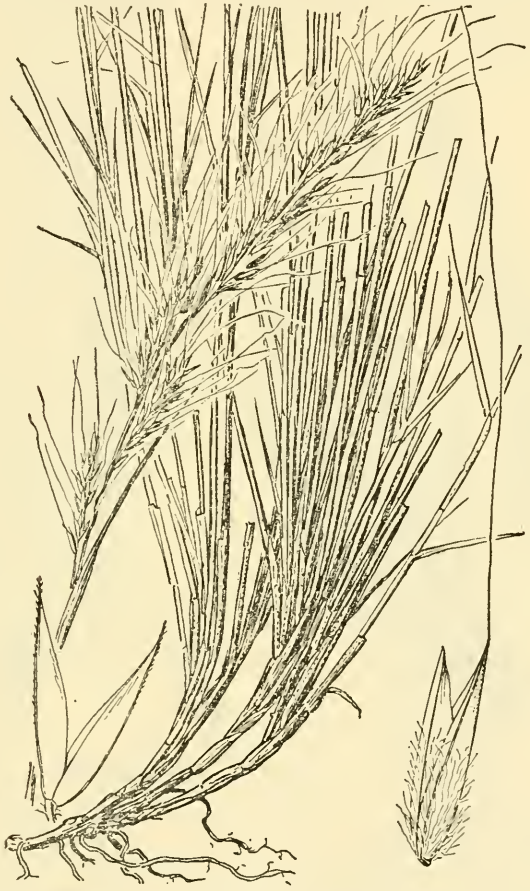

FIGURE 786.—*Muhlenbergia polycaulis*. Plant, × 1; glumes and floret, × 10. (Type.)

to northern Mexico (fig. 793). Known also as mesquite grass and black grama.

42. Muhlenbergia torréyi (Kunth) Hitchc. RINGGRASS. (Fig. 794.) Perennial in loose tufts, with numerous innovations, the base decumbent or forming short rhizomes, the plants usually gregarious, sometimes forming large patches or "fairy rings"; culms slender, 10 to 30 cm tall; leaves in a short basal cluster; blades closely involute, usually 2 to 3 cm long, falcate or flexuous, forming a crisp curly cushion; panicle open, usually about half the entire length of the

culm, commonly purple, the capillary branches finally spreading, the pedicels mostly as long as the spikelets or longer; spikelets about 3 mm long, the glumes, including the awn-tip, about two-thirds as long; lemma nearly glabrous, tapering into a delicate awn about 3 mm long. ♃ (*M. gracillima* Torr.)—Plains, mesas, and dry hills, western Kansas and Colorado to Texas and Arizona (fig. 795).

43. Muhlenbergia arenícola Buckl. (Fig. 796.) Resembling *M. torreyi;* culms taller, mostly 30 to 50 cm tall; blades usually straight and on the average longer; panicle larger, mostly pale, the branches and pedicels appressed; spikelets slightly longer, the lemma scabrous.

FIGURE 787.—*Muhlenbergia arsenei.* Plant, × 1; glumes and floret, × 10. (Type.)

FIGURE 788.—*Muhlenbergia monticola.* Plant, × 1; glumes and floret, × 10. (Nealley 399, Tex.)

♃ —Sandy plains and mesas, western Kansas to Arizona, south to northern Mexico (fig. 797).

44. Muhlenbergia setifólia Vasey. (Fig. 798.) Perennial, tufted; culms erect, hard, wiry, 50 to 80 cm tall; sheaths with erect auricles, 2 to 10 mm long; blades involute, fine, scarcely 0.5 mm thick, very scabrous, flexuous, as much as 20 cm long; panicle narrow, open, 10 to 15 cm long, the capillary branches ascending, flexuous; spikelets, excluding awns, about 5 mm long, the glumes one-third to half as long, obtuse to subacute, often with a short delicate awn; lemma hairy on the callus, otherwise smooth, tapering into a flexuous awn 1.5 to 2 cm long. ♃ —Rocky hills, western Texas to Arizona and northern Mexico.

45. Muhlenbergia dúbia Fourn. PINE MUHLY. (Fig. 799.) Perennial, closely tufted; culms erect, hard and wiry at base, 30 to 100

cm tall; sheaths with erect firm auricles, 4 to 10 mm long, rarely longer; blades involute, scabrous; panicle narrow, sometimes almost spikelike, grayish, 10 to 30 cm long, rarely longer; spikelets about 4 mm long; glumes about half as long as the spikelet, minutely scaberulous, obtuse; lemma minutely scaberulous, with an awn as much as 4 mm long, rarely acuminate only. ♃ (*M. acuminata* Vasey;

FIGURE 789.—*Muhlenbergia parviglumis.* Panicle, × 1; glumes and floret, × 10. (Vasey, Tex.)

FIGURE 791.—Distribution of *Muhlenbergia pauciflora.*

FIGURE 790.—*Muhlenbergia pauciflora.* Plant, × 1; glumes and floret, × 10. (Wright 732, Tex.)

Sporobolus ligulatus Vasey and Dewey.)—Canyons and rocky hills, western Texas to Arizona and northern Mexico.

46. Muhlenbergia rígida (H.B.K.) Kunth. PURPLE MUHLY. (Fig. 800.) Perennial, densely tufted; culms erect, 60 to 100 cm tall; leaves crowded at base, old sheaths persistent, the sheaths with auricles 2 to 5 mm, rarely longer; blades flat or soon involute, flexuous, those of the innovations involute; panicle dark purple, narrow, finally loose and open, 15 to 30 cm long, the capillary branches ascending,

the lower as much as 10 cm long; spikelets, excluding awns, about 4 mm long, the glumes from minute to about one-fourth as long, acute to erose-obtuse; lemma strongly nerved, hairy on the callus

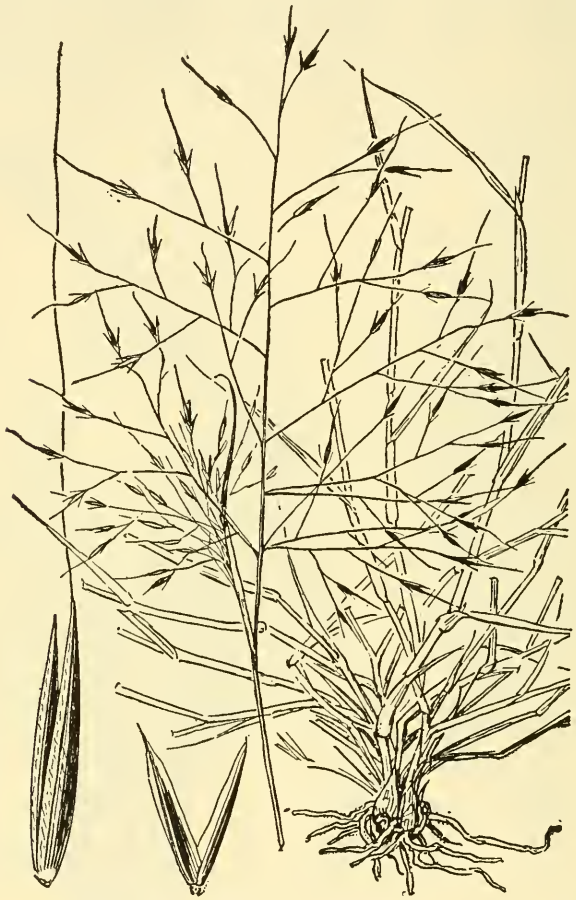

FIGURE 792.—*Muhlenbergia porteri.* Plant, × 1; glumes and floret, × 10. (Chase 5887, Tex.)

and with a flexuous awn 1 to 1.5 cm long. ♃ (*M. berlandieri* Trin.)—Rocky or gravelly soil, Texas to Arizona and northern Mexico.

47. Muhlenbergia metcálfei Jones. (Fig. 801.) Perennial, in close tufts; culms erect, 50 to 80 cm tall; ligule 3 to 10 mm long, sometimes longer; blades involute, slender, flexuous, scabrous, sometimes only slightly so, not crowded at base; panicle narrow but somewhat loose, pale or slightly purplish, 15 to 25 cm long, the branches usually naked at base; spikelets tapering to summit, about 4 mm long; glumes nearly equal, obtuse, a little less than half as long as spikelet; lemma scaberulous toward summit, the awn 5 to 10 mm long. ♃ —Rocky hills, Texas, New Mexico, and Arizona.

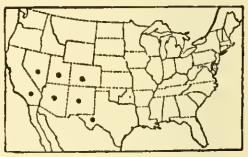

FIGURE 793.—Distribution of *Muhlenbergia porteri.*

48. Muhlenbergia capilláris (Lam.) Trin. (Fig. 802.) Perennial, in tufts; culms rather slender, erect, 60 to 100 cm tall; sheaths scaberulous, at least toward the summit, and with auricles mostly 3 to 5 mm long; blades elongate, flat or involute, 1 to 4 mm wide, those of the innovations narrower, involute; panicle purple, oblong diffuse, one-third to half the entire height of the culm,

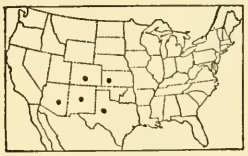

FIGURE 795.—Distribution of *Muhlenbergia torreyi.*

FIGURE 794.—*Muhlenbergia torreyi.* Plant, × 1; glumes and floret, × 10. (Chase 5298, Colo.)

the branches capillary, flexuous, the branchlets and pedicels finally spreading; spikelets, excluding awns, 3 to 4 mm long, the glumes

FIGURE 797.—Distribution of *Muhlenbergia arenicola.*

one-fourth to two-thirds as long, acute, the second often short-awned; lemma scaberulous, minutely hairy on the callus and with a delicate awn 5 to 15 mm long. ♃ —Rocky or sandy woods, Massachusetts to

FIGURE 796.—*Muhlenbergia arenicola.* Plant, × 1; glumes and floret, × 10. (Hitchcock 13602, Tex.)

Indiana and Kansas, south to Florida and Texas; West Indies, eastern Mexico (fig. 803).

MUHLENBERGIA CAPILLARIS var. FÍLIPES (M. A. Curtis) Chapm. Culms stouter; blades mostly involute; glumes with delicate awns, mostly longer than the lemma; lemma with a delicate setaceous tooth each side of the awn. 2l (*M. filipes* M. A. Curtis.)—Moist pine barrens near the coast, North Carolina, Florida, Mississippi, and Texas.

49. Muhlenbergia expánsa (DC.) Trin. (Fig. 804.) Resembling *M. capillaris*, in denser tufts, the old basal sheaths forming a curly fibrous mass; blades narrow, flat, becoming involute; panicle relatively smaller, narrower, the capillary branches and branchlets mostly straight; spikelets 3.5 to 5 mm long, the glumes one-third to two-thirds as long, acute to acuminate; lemma scaberulous, nearly glabrous at base, awnless or with an awn as much as 2 mm long, rarely longer. 2l (*M. trichopodes* Chapm.)—Moist pine barrens near the coast, North Carolina to Florida and Texas (fig. 805).

FIGURE 798.—*Muhlenbergia setifolia*. Plant, × 1; glumes and floret, × 10. (Hitchcock 13507, N.Mex.)

FIGURE 799.—*Muhlenbergia dubia*. Plant, × 1; glumes and floret, × 10. (Hitchcock 3775, N.Mex.)

50. Muhlenbergia reverchóni Vasey and Scribn. (Fig. 806.) Resembling *M. expansa*, culms more slender, foliage finer; glumes less than half as long as the lemma, subacute or erose; lemma with an awn 2 to 5 mm long. 2l —Rocky prairies, Texas.

51. Muhlenbergia longilígula Hitchc. (Fig. 807.) Culms erect, about 1 m tall, the base hard, wiry, cylindric, the lower sheaths expanded; ligule (or auricle of sheath) firm, usually about 1 cm long; blades as much as 50 cm long, 2 to 5 mm wide, flat to subinvolute, very scabrous, usually drying involute; panicle narrow, somewhat

FIGURE 800.—*Muhlenbergia rigida.* Panicle and ligule, × 1; glumes and floret, × 10. (Metcalfe 1447, N.Mex.)

loose, erect, 20 to 40 cm long, the branches ascending or appressed; spikelets 2 to 3 mm long; glumes subequal, acutish, usually glabrous; lemma usually about as long as the glumes, glabrous, awnless, rarely with a minute awn. ♃ (*Epicampes ligulata* Scribn., not *Muhlenbergia ligulata* Scribn. and Merr.)—Canyons and rocky slopes, western New Mexico, Arizona, southern Nevada, and northern Mexico.

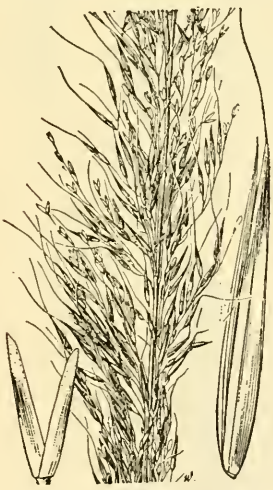

FIGURE 801.—*Muhlenbergia metcalfei.* Panicle, × 1; glumes and floret, × 10. (Metcalfe, N.Mex.)

52. Muhlenbergia lindheiméri Hitchc. (Fig. 808.) Culms erect, 1 to 1.5 m tall, the numerous overlapping lower sheaths keeled; ligule rather thin, elongate, mostly hidden in the folded base of the blade; blades elongate, firm, flat or usually folded, about 3 mm wide, scaberulous or glabrous; panicle narrow, pale, somewhat loose, erect, 20 to 40 cm long, the branches ascending or appressed; spikelets 2.5 to 3 mm long; glumes acute to rather obtuse, scabrous-puberulent; lemma a little shorter to a little longer than the glumes, 3-nerved, glabrous or obscurely pubescent, awnless or rarely with an awn as much as 3 mm long. ♃ —Rocky slopes, Texas.

53. Muhlenbergia involúta Swallen. (Fig. 809.) Culms erect, densely tufted, 60 to 135 cm tall; sheaths compressed-keeled; scabrous; ligule about 10 mm long; blades elongate, involute, wiry, scabrous; panicle erect, narrow, 30 to 40 cm long, the subcapillary branches ascending or appressed, naked toward the base, the lower as much as 20 cm long; spikelets 3 to 4.5 mm long; glumes acute or somewhat erose, scabrous, 2 to 2.5 mm long; lemma densely pubescent on the margin toward the very base, the minutely toothed apex awned from just below the teeth, the awn slender, 1.5 to 2 mm long. ♃ —Canyons and ravines, southern Texas.

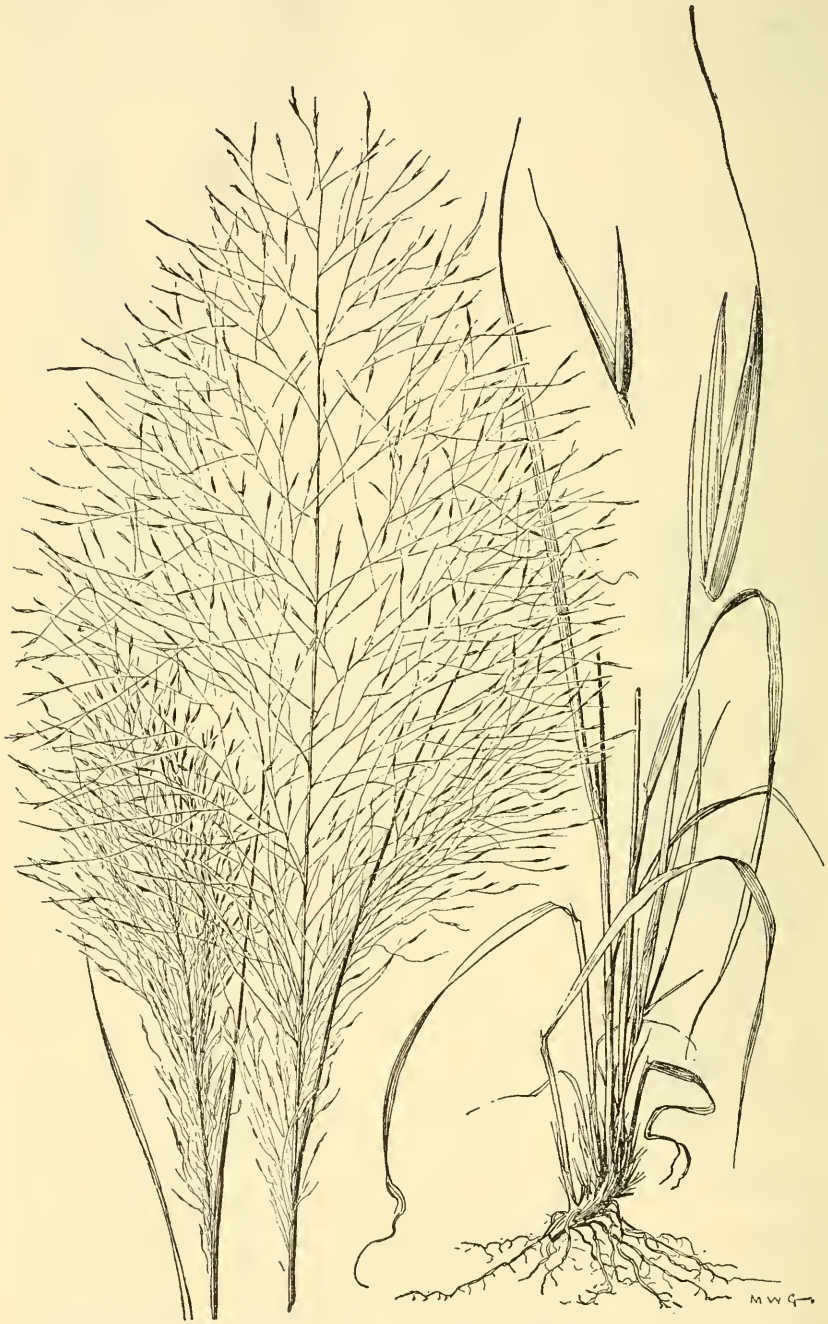

FIGURE 802.—*Muhlenbergia capillaris.* Plant, × ½; glumes and floret, × 10. (Scribner, Tenn.)

54. Muhlenbergia emersléyi Vasey. BULLGRASS. (Fig. 810.) Culms in large clumps, erect, 50 to 100 cm tall; sheaths glabrous, slightly scabrous, compressed-keeled, especially those of the innovations; ligule softly membranaceous, 1 to 2 cm long; blades flat or

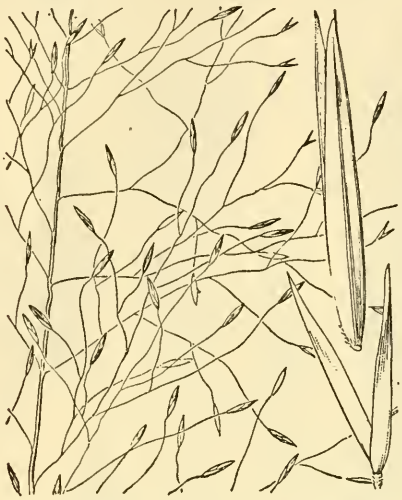

FIGURE 804.—*Muhlenbergia expansa.* Panicle, × 1; glumes and floret, × 10. (Tracy 3701, Miss.)

FIGURE 803.—Distribution of *Muhlenbergia capillaris.*

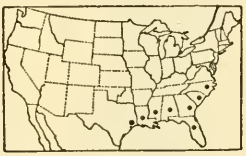

FIGURE 805.—Distribution of *Muhlenbergia expansa.*

folded, scabrous, 1 to 4 mm wide, the lower as much as 50 cm long; panicle narrow but rather loose, erect or nodding, mostly 20 to 40 cm long, the branches ascending, more or less fascicled or whorled, naked below; spikelets 3 to 4 mm long, often purplish; glumes thin,

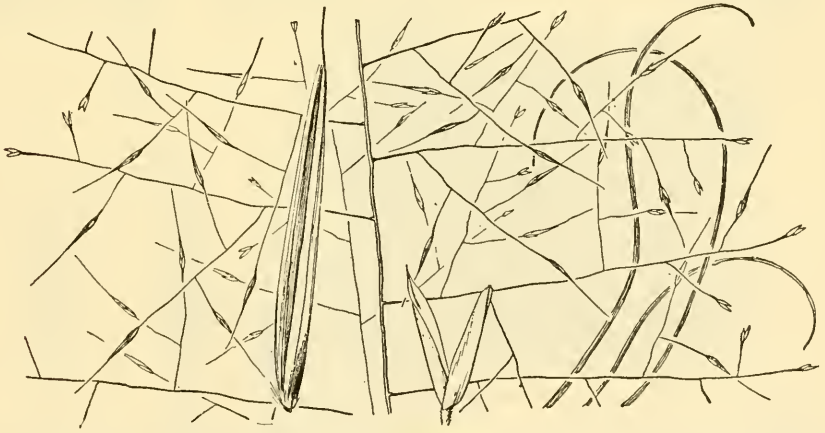

FIGURE 806.—*Muhlenbergia reverchoni.* Panicle, × 1; glumes and floret, × 10. (Reverchon, Tex.)

equal, acutish, scabrous; lemma about as long as the glumes, narrowed and scabrous above, villous below, with a delicate flexuous awn, about 1 cm long, or sometimes awnless. ♃ —Rocky woods and ravines, Texas to Arizona and Mexico. The awnless form with usually more open panicle has been differentiated as *Epicampes subpatens* Hitchc.

55. Muhlenbergia rígens (Benth.) Hitchc. DEERGRASS. (Fig. 811.) Culms rather slender stiffly erect, in small bunches, with a hard tough base, sometimes with short rhizomes, 1 to 1.5 m tall; sheaths smooth or slightly scabrous, mostly overlapping, the lower crowded, expanded, somewhat papery; ligule firm, truncate, 1 to 2 mm long; blades scabrous, elongate, involute, tapering into a long slender point; panicle grayish or pale,

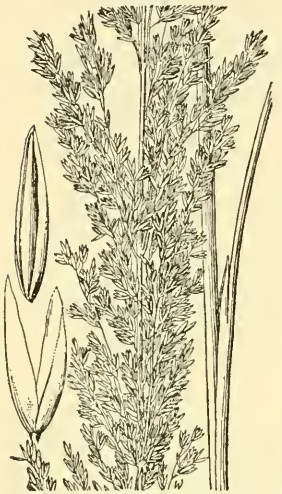

FIGURE 807.—*Muhlenbergia longiligula.* Panicle and ligule, × 1; glumes and floret, × 10. (Jones, Ariz.)

FIGURE 808.—*Muhlenbergia lindheimeri.* Panicle, × 1; glumes and floret, × 10. (Type.)

FIGURE 809.—*Muhlenbergia involuta.* Panicle and ligule, × 1; spikelet and floret, × 10. (Type.)

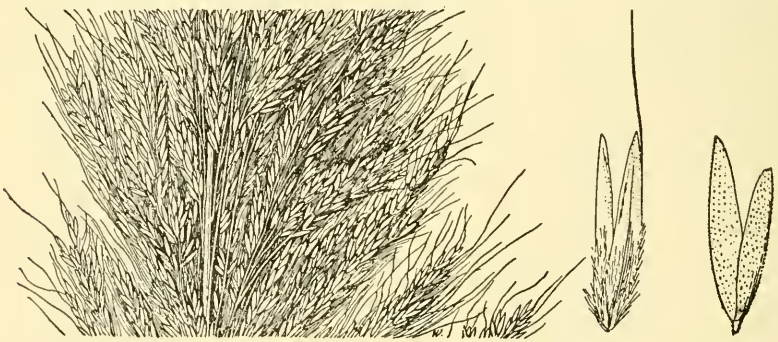

FIGURE 810.—*Muhlenbergia emersleyi.* Panicle, × 1; glumes and floret, × 10. (Wooton and Standley, N.Mex.)

slender, spikelike, 15 to 30 cm long or more; glumes 2 to 3 mm long, from acute to obtuse or somewhat erose, scabrous-puberulent, rarely faintly 3-nerved; lemma slightly exceeding the glumes, scaberulous, sparsely pilose at base, 3-nerved toward the narrowed summit, awnless. 2↓ (*Epicampes rigens* Benth.)—Dry or open ground, hillsides, gullies, and open forest, Texas to southern California and northern Mexico (fig. 812).

FIGURE 811.—*Muhlenbergia rigens*. Plant, × 1; glumes and floret, × 10. (Metcalfe 10, N.Mex.)

FIGURE 812.—Distribution of *Muhlenbergia rigens*

76. SPORÓBOLUS R. Br. Dropseed

Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes 1-nerved, usually unequal, the second often as long as the spikelet; lemma membranaceous, 1-nerved, awnless; palea usually prominent and as long as the lemma or longer; caryopsis free from the lemma and palea, falling readily from the spikelet at maturity, the pericarp free from the seed, usually thin and closely enveloping it, but readily slipping away when moist. Annuals or perennials, with small spikelets in open or contracted panicles. Type species, *Sporobolus indicus*. Name from Greek *spora*, seed, and *ballein*, to throw, alluding to the free seeds. In some species of this genus the palea splits at maturity, giving the impression of extra lemmas. The first glume is early deciduous in some species. The size of the spikelets is often variable in the same panicle.

Most of the perennial species are palatable forage grasses, but few of the them are abundant enough to be of importance. Two species of the Southwest, *S. airoides* and *S. wrightii*, are valuable grasses in the arid and semiarid regions; *S. interruptus* is common on the Arizona Plateau; and the widely distributed *S. cryptandrus* is also important. The seed of *S. flexuosus* and *S. cryptandrus* have been used for food by the Indians.

1a. Plants annual.
  Panicle narrow, few-flowered, spikelike.
    Lemma pubescent ..... 6. S. VAGINIFLORUS.
    Lemma glabrous ..... 7. S. NEGLECTUS.
  Panicle open, many-flowered.
    Pedicels very short, appressed; glumes glabrous ..... 1. S. RAMULOSUS.
    Pedicels elongate, spreading; glumes usually sparsely pubescent. 2. S. MICROSPERMUS.

1b. Plants perennial.
  2a. Plants producing creeping rhizomes. Panicle narrow or spikelike.
    Rhizomes extensively creeping; leaves numerous, crowded, the blades involute, conspicuously distichous; panicle spikelike ..... 3. S. VIRGINICUS.
    Rhizomes short; leaves not numerous nor crowded nor involute; panicle narrow but loose ..... 9. S. MACRUS.
  2b. Plants without creeping rhizomes.
    3a. Glumes nearly equal, much shorter than the lemma. Panicle narrow or spikelike.
      Panicle branches short and appressed, the panicle spikelike. 4. S. POIRETII.
      Panicle branches slender, ascending, the panicle scarcely spikelike. 5. S. INDICUS.
    3b. Glumes unequal or if equal as long as the spikelet.
      4a. Spikelets mostly 3 to 7 mm long. Plants usually less than 1 m tall.
        Second glume shorter than the lemma; panicle contracted, more or less included in the sheath.
          Lemma glabrous, the palea not exceeding it ..... 8. S. ASPER.
          Lemma pubescent, the palea acuminate, exceeding it. 10. S. CLANDESTINUS.
        Second glume about as long as the lemma; panicle open (contracted in *S. purpurascens*), not included.
          Branches of the narrow panicle in distinct whorls, usually less than 4 cm long.
            Branches 2 to 3 cm long, somewhat distant, more or less spreading, the panicle open ..... 16. S. GRACILIS.
            Branches 1 to 2 cm long, ascending or appressed, overlapping, the panicle contracted ..... 17. S. PURPURASCENS.
          Branches of the open panicle not in distinct whorls, usually more than 4 cm long.

Spikelets short-pediceled and appressed along the main panicle-branches.
Spikelets about 4 mm long, purplish---------- 13. S. CURTISSII.
Spikelets about 3 mm long, pale---------- 29. S. THARPII.
Spikelets not appressed, the branchlets and pedicels somewhat spreading.
Blades terete---------- 14. S. TERETIFOLIUS.
Blades flat or folded.
Glumes about equal, as long as the lemma. 15. S. FLORIDANUS.
Glumes unequal.
Blades elongate---------- 12. S. HETEROLEPIS.
Blades mostly less than half as long as culm. 11. S. INTERRUPTUS.

4b. Spikelets 1 to 2.5 mm long (sometimes 3 mm in *S. giganteus*).
5a. Lower panicle branches in distinct whorls, the mature panicle pyramidal; spikelets about 1 mm long---------- 18. S. ARGUTUS.
5b. Lower panicle branches not in distinct whorls (occasionally whorled in *S. domingensis*); spikelets 1.5 to 2.5 mm long.
6a. Basal sheaths compressed-keeled. Panicle branches few, widely spreading, naked for about one-third their length; spikelets 1.5 mm long---------- 25. S. BUCKLEYI.
6b. Basal sheaths not compressed-keeled.
7a. Sheaths with a conspicuous tuft of white hairs at summit.
Culms robust, 1 to 2 m tall; spikelets 2.5 to 3 mm long. 24. S. GIGANTEUS.
Culms more slender, mostly less than 1 m tall; spikelets 2 to 2.5 mm long.
Panicle open, often large, the branches and branchlets flexuous, the spikelets loosely arranged---------- 21. S. FLEXUOSUS.
Panicle open or compact, if open the spikelets crowded on the branchlets.
Panicle, or the exserted portion, somewhat open, the branches naked below (sometimes entirely enclosed).
Base of plant a close tuft---------- 20. S. CRYPTANDRUS.
Base of plant a cluster of knotty rhizomes. Culms erect, slender, mostly less than 30 cm tall; blades short, involute, spreading---------- 22. S. NEALLEYI.
Panicle compact, spikelike, usually exserted. 23. S. CONTRACTUS.
7b. Sheaths naked or nearly so at the summit.
Pedicels elongate, capillary---------- 28. S. TEXANUS.
Pedicels short.
Panicle 1 to 2 times as long as wide, loose, the branches not crowded; blades mostly involute---- 26. S. AIROIDES.
Panicle more than 3 times as long as wide, relatively dense; blades mostly flat.
Panicle not more than 20 cm long, usually smaller. 19. S. DOMINGENSIS.
Panicle commonly 50 cm long, rarely as small as 25 or 30 cm---------- 27. S. WRIGHTII.

1. Sporobolus ramulósus (H. B. K.) Kunth. RED DROPSEED. (Fig. 813.) Annual; culms spreading, branching at the lower nodes, 10 to 20 cm tall; blades flat, lax, mostly 1 to 3 cm long, 1 mm wide or less; panicle oblong, 2 to 5 cm long, the branches ascending, the pedicels short, stiff, appressed along the main branches; spikelets about 1 mm long; glumes broad, obtuse, about equal, half as long as the spikelet; lemma rather turgid, acutish. ⊙ Open dry ground, Colorado, New Mexico, Arizona, south to Guatemala.

2. Sporobolus microspérmus (Lag.) Hitchc. SIXWEEKS DROPSEED. (Fig. 814.) Annual; culms erect or spreading, branching below, 10 to 30 cm tall; blades flat, lax, mostly less than 10 cm long, 1 to 2 mm wide; panicle oblong, open, half or two-thirds as long as the entire culm, the slender pedicels spreading, club-shaped below the spikelets; spike-

lets 1 to 1.8 mm long; glumes obtuse, about equal, about half as long as the spikelet or a little more, sparsely sometimes obscurely pilose; lemmas obtuse, minutely pubescent on midnerve and margins. ⊙ (*S. confusus* Vasey; *S. minutissimus* Hitchc.)—Sandy or rocky open ground, Montana to eastern Washington, south to Nebraska, Texas,

FIGURE 813.—*Sporobolus ramulosus.* Plant, × 1; glumes and floret, × 10. (Hitchcock 7661, Mex.)

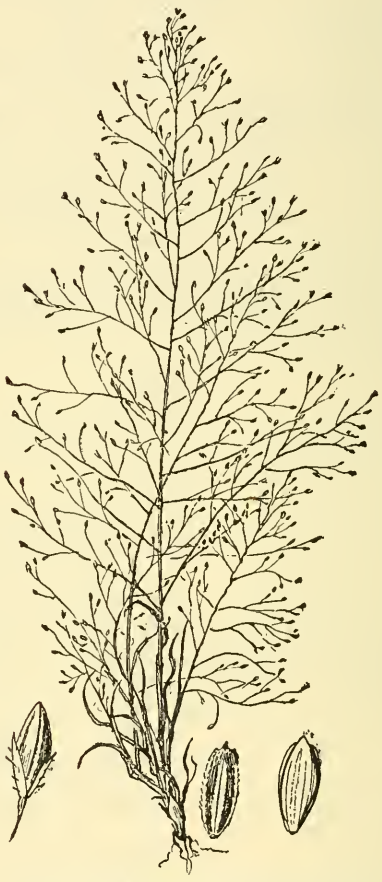

FIGURE 814.—*Sporobolus microspermus.* Plant, × 1; spikelet and 2 views of floret, × 10. (Hitchcock 3788, N.Mex.)

and New Mexico, west to southern California, and south to Costa Rica (fig. 815).

3. Sporobolus virginicus (L.) Kunth. (Fig. 816.) Perennial, with numerous branching widely creeping slender rhizomes (yellowish in drying); culms erect, 10 to 40 cm tall; sheaths overlapping, more or less pilose at the throat; blades flat or becoming involute especially toward the fine point, conspicuously distichous, mostly less than 5 cm long or on the innovations longer; panicle pale, contracted or spike-like, 2 to 8 cm long, 5 to 10 mm thick; spikelets 2 to 2.5 mm long; glumes and lemma about equal. ♃ —Sandy or muddy seashores and saline marshes, forming extensive colonies, with relatively few flower-

ing culms, southeastern Virginia (Gron. Fl. Virg.) to Florida and Texas, south through the West Indies to Brazil (fig. 817). A robust form (*S. littoralis* Kunth), with culms as much as 1 m tall and panicles as much as 15 cm long, is found in the West Indies and extends into Florida.

FIGURE 815.—Distribution of *Sporobolus microspermus.*

4. Sporobolus poirétii (Roem. and Schult.) Hitchc. SMUTGRASS. (Fig. 818, *A.*) Perennial; culms erect, solitary or in small tufts, 30 to 100 cm tall; blades flat to subinvolute, rather firm, 2 to 5 mm wide at base, elongate, tapering to a fine point; panicle usually spikelike but more or less interrupted, 10 to 40 cm long, the branches appressed or ascending; spikelets about 2 mm long; glumes obtuse, somewhat unequal, about half as long as the spikelet or less; lemma acutish. ♃ (*Sporobolus berteroanus* Hitchc. and Chase.)—Open ground and waste places, Virginia to Tennessee and Arkansas, south to Florida, Texas, and the warmer parts of America to Argentina; on ballast in Oregon and New Jersey (fig. 819); tropical Asia, apparently introduced in America. At maturity the extruded reddish caryopses remain for some time sticking to the panicle by the mucilaginous pericarp. Often affected with a black fungus. This species has been referred to the Australian *S. elongatus* R. Br., which seems to be distinct, differing in its looser panicle.

FIGURE 816.—*Sporobolus virginicus.* Plant, × 1; glumes and floret, × 10. (Nash 2467, Fla.)

FIGURE 817.—Distribution of *Sporobolus virginicus.*

5. Sporobolus indicus (L.) R. Br. (Fig. 818, *B.*) Resembling *S. poiretii*, but the blades more slender, especially at base, and the panicle branches longer, more slender, less densely flowered, loosely ascending to somewhat spreading, the panicle not spikelike. ♃ Punta Gorda, Fla.—Ballast, Mobile, Ala.; tropical America.

6. Sporobolus vaginiflórus (Torr.) Wood. (Fig. 820.) Annual, branching from base; culms erect to spreading, mostly 20 to 40 cm tall, sometimes as much as 75 cm; blades slender, subinvolute, the

lower elongate; panicles terminal and axillary, slender, mostly not more than 3 cm long, the terminal exserted or partly included, the

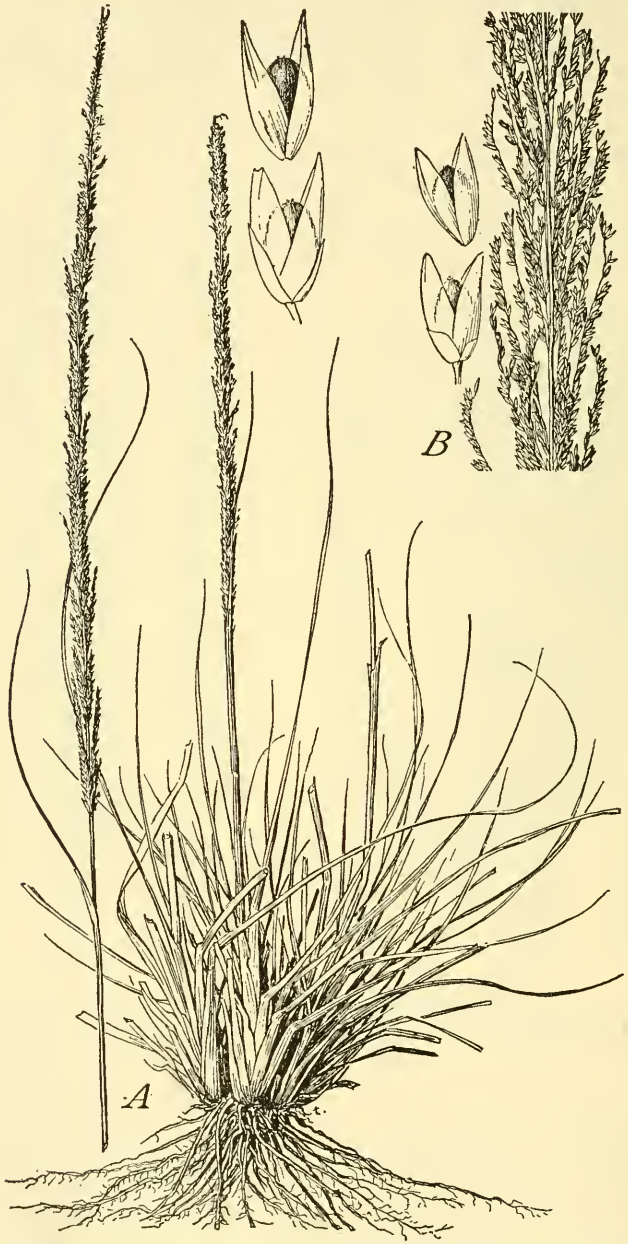

FIGURE 818.—*A*, *Sporobolus poiretii*. Plant, × ½; spikelet and floret, × 10. (Chase 7043, Fla.) *B*, *S. indicus*. Panicle, × 1; spikelet and floret, × 10. (Leon 867, Cuba.)

axillary included in the sheaths or slightly exserted, late in the season the sheaths swollen and containing cleistogamous spikelets; glumes

acute, about equal, 3 to 5 mm long; lemma as long as the glumes or exceeding them, acute or acuminate, rather sparsely pubescent, sometimes mottled with dark spots; palea acuminate, sometimes longer than the lemma. ⊙ —Sandy soil or open waste ground, Maine and Ontario to Minnesota and Nebraska, south to Georgia, Texas, and Arizona (fig. 821).

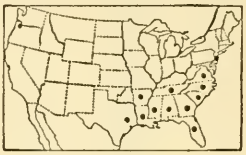

FIGURE 819.—Distribution of *Sporobolus poiretii.*

7. Sporobolus negléctus Nash. (Fig. 822.) Differing from *S. vaginiflorus* chiefly in the smaller, paler, plumper spikelets, 2 to 3 mm long, and in the glabrous lemma; lower blades often sparsely pilose; panicles usually entirely hidden in the more swollen sheaths. ⊙ —Dry open ground and sandy fields, Quebec and Maine to North Dakota, south to Maryland, Tennessee, and Texas; also Washington and Arizona (fig. 823). A form from Missouri (Ozark Mountains), with rather strongly pilose leaves, has been called *S. ozarkensis* Fernald.

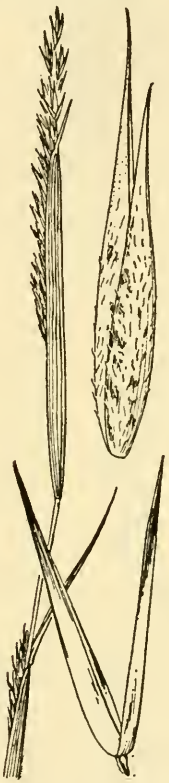

FIGURE 820.—*Sporobolus vaginiflorus.* Plant, × 1; glumes and floret, × 10. (Deam 39615, Ind.)

FIGURE 821.—Distribution of *Sporobolus vaginiflorus.*

8. Sporobolus ásper (Michx.) Kunth. (Fig. 824.) Perennial; culms erect, often rather stout, solitary or in small tufts, 60 to 120 cm tall; blades elongate, flat, becoming involute, 1 to 4 mm wide at base, tapering to a fine point; panicle terminal and axillary, pale or whitish, sometimes purplish, contracted, more or less spikelike, usually enclosed at base or sometimes entirely in the inflated upper sheath, 5 to 15 cm long; spikelets 4 to 6 mm long glumes rather broad, keeled, subacute, the first about half as long as the spikelet, the second two-thirds to three-fourths as long; lemma and palea subequal, glabrous, the tip boat-shaped. 2l —Prairies and sandy meadows, Vermont to Michigan, North Dakota, and Utah, south to Louisiana and New Mexico; eastern Washington (fig. 825).

FIGURE 822.—*Sporobolus neglectus.* Plant, × 1; spikelet and floret, × 10. (Deam 33426, Ind.)

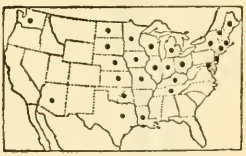

FIGURE 823.—Distribution of *Sporobolus neglectus.*

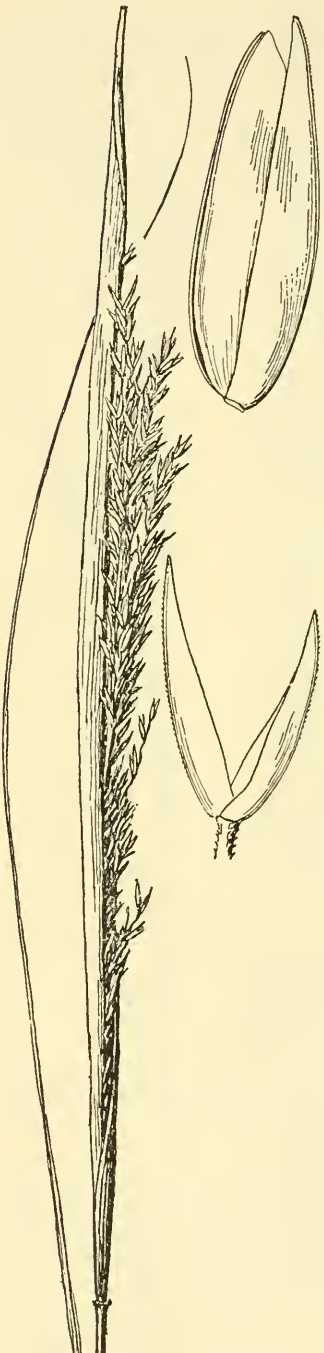

FIGURE 824.—*Sporobolus asper*. Plant, × 1; glumes and floret, × 10. (Deam 42707, Ind.)

SPOROBOLUS ASPER var. PILÓSUS (Vasey) Hitchc. Sheaths and blades more or less pilose. 2↓ (*S. pilosus* Vasey.)—Prairies and rocky hills, Kansas (Saline County and westward), Texas (Del Rio).

SPOROBOLUS ASPER var. HOOKÉRI (Trin.) Vasey. Less robust, the more slender fewer-flowered panicle looser; spikelets usually smaller, 3 to 5 mm long. 2↓ (*S. attenuatus* Nash; *S. drummondii* Vasey.)—Plains, Missouri, Mississippi, Texas, and Oklahoma. Foliage rarely somewhat villous.

9. Sporobolus mácrus (Trin.) Hitchc. (Fig. 826.) Perennial, with short scaly rhizomes; culms erect, 50 to 70 cm tall; blades flat, 10 to 20 cm long, 1 to 2 mm wide, sometimes wider, pilose on the upper surface near base and at the throat of the sheath; panicle narrow, often enclosed at base, 5 to 15 cm long, the branches erect; spikelets 4 to 5 mm long, the glumes keeled, the first about two-thirds as long, the second a little longer than the first; lemma and palea subequal, the tips boat-shaped. 2↓ —Wet pineland, Oklahoma, Mississippi, and Louisiana. Except for the rhizomes this species resembles *S. asper* var. *hookeri*.

FIGURE 825.—Distribution of *Sporobolus asper*.

10. Sporobolus clandestínus (Spreng.) Hitchc. (Fig. 827.) Perennial; culms relatively stout to slender, erect to spreading, 50 to 100 cm tall; lower sheaths sometimes pilose; blades flat, becoming involute, with a long fine point; panicle narrow, contracted, 5 to 10 cm long, usually partly enclosed; spikelets 5 to 7 mm long, the glumes keeled, acute or subacute, the first more than half as long as the spikelet, the second longer than the first; lemma sparsely appressed-pubescent, acuminate, the palea longer, sometimes as much as 10 mm long. 2↓ (*S. canovirens* Nash.)—Sandy fields, pine barrens, hills, and prairies, Connecticut to Illinois and Kansas, south to Florida and Texas (fig. 828).

11. Sporobolus interrúptus Vasey. BLACK DROPSEED. (Fig. 829.) Perennial, densely tufted; culms erect, 30 to 60 cm tall, the leaves crowded at base, about 2 on the culm; sheaths more or less pilose;

FIGURE 826.—*Sporobolus macrus*. Plant, × 1; glumes and floret, × 10. (Chase 4341, Miss.)

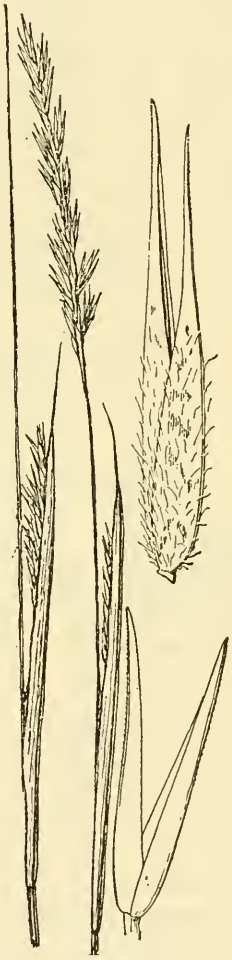

FIGURE 827.—*Sporobolus clandestinus*. Plant, × 1; glumes and floret, × 10. (Chase 4265, Fla.)

blades flat or folded, sparsely pilose to glabrous, 1 to 2 mm wide; panicle 10 to 20 cm long, brownish-leaden, the branches distant, finally spreading, naked at base; spikelets about 6 mm long, short-

pediceled; glumes acute, the first 2 to 3 mm, the second 4 to 6 mm long; lemma and palea acute, about equal. ♃ —Grassy plains and hills, Arizona. The second glume and lemma may have wrinkles toward the summit that look like nerves.

12. Sporobolus heterólepis A. Gray. PRAIRIE DROPSEED. (Fig. 830.) Perennial, in dense tufts; culms erect, slender, 30 to 70 cm tall; sheaths somewhat pilose at the throat, the lower sometimes sparsely pilose on the back; blades elongate, flat, becoming involute at the slender attenuate tip, 2 mm or less wide; panicle, 5 to 20 cm long, the branches ascending or spreading, 3 to 6 cm long, naked below, few-flowered above; spikelets grayish; glumes acuminate, the first 2 to 4 mm long, the second 4 to 6 mm long; lemma shorter than the second glume, palea slightly longer than the lemma; caryopsis globose, nutlike, nearly 2 mm thick, finally splitting the palea. ♃ —Prairies, Quebec to Saskatchewan and Wyoming, south to Connecticut, Illinois, Arkansas, and eastern Texas (fig. 831).

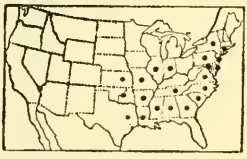

FIGURE 828.—Distribution of *Sporobolus clandestinus.*

FIGURE 829.—*Sporobolus interruptus.* Plant, × 1; glumes and floret, × 10. (Rusby, Ariz.)

13. Sporobolus curtíssii (Vasey) Small. (Fig. 832.) Perennial, in dense tufts; culms slender, 30 to 70 cm tall; basal sheaths pilose at the throat; blades flat or folded, flexuous, about 1 mm wide, pilose on the upper surface near the base; panicle pyramidal, open, 7 to 20 cm long, the branches solitary or in twos, ascending; spikelets appressed along the main branches, bronze or purplish, about 4.5 mm long; glumes about equal, acuminate, as long as or longer than the lemma and palea. ♃ —Dry pine barrens, North Carolina, Georgia, and Florida.

14. Sporobolus teretifólius Harper. (Fig. 833.) Perennial, in tufts; culms erect, wiry, 60 to 80 cm tall, sheaths pilose at the throat; blades elongate, slender, terete, wiry, flexuous, pilose on the upper surface at base; panicle pyramidal, open, 15 to 20 cm long, the capil-

lary branches, branchlets, and pedicels ascending to spreading; spikelets purplish-brown, about 4 mm long; glumes acute, the first half as long, the second as long as the equal lemma and palea. 2l —Moist pine barrens, Georgia.

15. Sporobolus floridánus Chapm. (Fig. 834.) Plants more robust than *S. curtissii*, as much as 1 m tall; sheaths keeled, the basal ones somewhat pilose at throat, the base indurate and shining, blades folded at base, usually flat above, 2 to 5 mm wide, abruptly narrowed at apex; panicle narrow, open, 15 to 35 cm long, the branches and branchlets ascending; spikelets 4 to 5 mm long; glumes acute, subequal, about as long as the lemma and palea. 2l —Low pine barrens, Georgia and Florida.

16. Sporobolus grácilis (Trin.) Merr. (Fig. 835.) Perennial, in dense bunches; culms erect, slender, about 3-noded, 30 to 60 cm tall; blades folded or involute, slender, glabrous; panicle mostly bronze-brown, oblong or narrowly pyramidal, open, 7 to 15 cm long, 2 to 5 cm wide, the flexuous branches (2 to 3 cm long) in rather regular whorls 1 to 3 cm apart, widely spreading to ascending, naked at base, the short-pediceled spikelets appressed along the upper part; spikelets

FIGURE 830.—*Sporobolus heterolepis*. Plant, × 1; spikelet and floret with caryopsis and split palea, × 10. (McDonald, Ill.)

about 3 mm long; first glume about half as long, the second glume as long as the acute lemma or a little longer. ♃ (*S. junceus* Kunth.)—Pine barrens of the Coastal Plain, southeastern Virginia to Florida and Texas (fig. 836). Common in the high pineland of Florida.

17. Sporobolus purpurascens (Swartz) Hamilt. (Fig. 837.) Resembling *S. gracilis;* blades flat or folded, 1 to 3 mm wide; panicle 10 to 15 cm long, more contracted than in *S. gracilis*, the shorter branches numerous in the whorls, ascending or appressed, floriferous nearly to the base; spikelets about as in *S. gracilis*, greenish-purple. ♃ —Sandy prairies, southern Texas and eastern Mexico; West Indies to Brazil.

FIGURE 831.—Distribution of *Sporobolus heterotepis.*

18. Sporobolus argutus (Nees) Kunth. (Fig. 838.) Perennial, in spreading or prostrate tufts; culms 10 to 40 cm tall; leaves crowded at the base, the sheaths pilose at the throat; blades flat, mostly less than 10 cm long, 2 to 4 mm wide, sparsely long-ciliate toward the base; panicle pale, pyramidal, 3 to 7 cm long, rarely longer, the branches spreading, somewhat viscid, 1 to 3 cm long, naked below, closely flowered above, the lowermost in a distinct whorl; spikelets a little more than 1 mm long; first glume minute, the second as long as the lemma and palea. ♃ —Sandy or gravelly soil, especially along streets and along the seashore and in the interior in alkaline soil, Kansas and Colorado to Louisiana and Texas; Arizona; southern Florida; tropical America (fig. 839).

FIGURE 832.—*Sporobolus curtissii.* Panicle, × 1; glumes and floret, × 10. (Bitting 1050, Fla.)

19. Sporobolus domingensis (Trin.) Kunth. (Fig. 840.) Differing from *S. argutus* in the usually larger size (culms sometimes as much as 1 m tall), broader blades, 3 to 6 mm wide, and stiffer longer panicles, the branches ascending or appressed, overlapping, less regularly in whorls; spikelets about 2 mm long, the first glume half as long. ♃ —Coral sand and rocks along the coast of southern Florida, mostly on the Keys, north to Sanibel Island; West Indies.

20. Sporobolus cryptandrus (Torr.) A. Gray. SAND DROPSEED. (Fig. 841, *A.*) Perennial, usually in rather small tufts; culms erect or spreading, sometimes prostrate, 30 to 100 cm tall; sheaths with a conspicuous tuft of long white hairs at summit; blades flat, 2 to 5 mm wide, more or less involute in drying, tapering to a fine point; panicles

terminal and axillary, usually included at base, sometimes entirely

FIGURE 833.—*Sporobolus teretifolius*. Plant, × 1; glumes and floret, × 10. (Harper 677, Ga.)

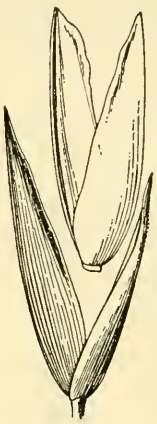

FIGURE 834.—*Sporobolus floridanus*, × 10. (Curtiss 4054, Fla.)

FIGURE 835.—*Sporobolus gracilis*. Panicle, × 1; glumes and floret, × 10. (Curtiss 4056, Fla.)

FIGURE 836.—Distribution of *Sporobolus gracilis*.

included, the well-developed terminal panicles open, as much as 25

cm long, the branches spreading or sometimes reflexed, rather distant, naked at base, as much as 8 cm long or even more, the spikelets crowded along the upper part of the main branches; spikelets from pale to leaden, 2 to 2.5 mm long; first glume one-third to half as long, the second about as long, as the acute lemma and palea. ♃ —Sandy open

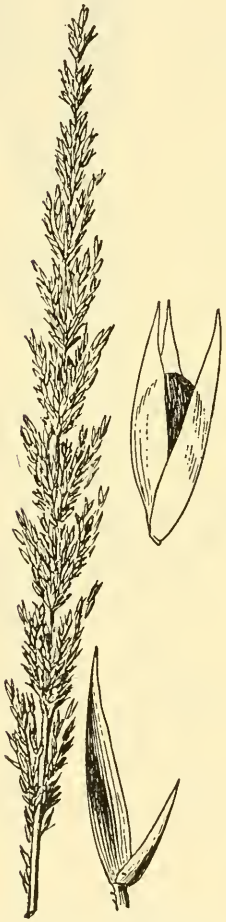

FIGURE 837.—*Sporobolus purpurascens.* Panicle, × 1; glumes and floret, × 10. (Hitchcock, Tex.)

FIGURE 838.—*Sporobolus argutus.* Panicle, × 1; glumes and floret, × 10. (Hitchcock 5343, Tex.)

FIGURE 839.—Distribution of *Sporobolus argutus.*

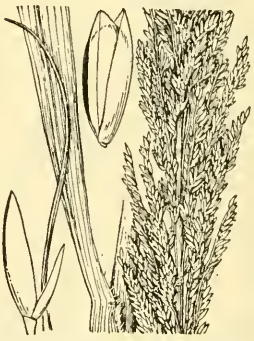

FIGURE 840.—*Sporobolus domingensis.* Plant, × 1; glumes and floret, × 10. (Hitchcock 530, Fla.)

ground, Maine and Ontario to Alberta and Washington, south to North Carolina, Indiana, Louisiana, Arizona, and northern Mexico (fig. 842).

21. Sporobolus flexuósus (Thurb.) Rydb. MESA DROPSEED. (Fig. 841, *B.*) Resembling *S. cryptandrus*, differing in the more open often elongate panicles, the slender branches and branchlets spreading

FIGURE 841.—*A*, *Sporobolus cryptandrus*. Plant, × ½; glumes and floret, × 10. (Shear 253, Nebr.) *B*, *S. flexuosus*. Plant, × ½; glumes and floret, × 10. (Vasey, N.Mex.) *C*, *S. nealleyi*. Panicle, × ½; glumes and floret, × 10. (Nealley, Tex.) *D*, *S. contractus*. Panicle, × ½; glumes and floret, × 10. (Pringle, Ariz.)

or drooping, flexuous, loosely flowered. ♃ —Mesas, western Texas to southern Utah, southeastern California, and northern Mexico (fig. 843).

22. Sporobolus nealléyi Vasey. NEALLEY DROPSEED. (Fig. 841, *C.*) Resembling dwarf forms of *S. cryptandrus*, but differing in the loose rhizomatous base; culms slender, erect, 15 to 40 cm tall; blades slender, involute, squarrose-spreading, mostly less than 5 cm long; panicle delicate, open, 3 to 8 cm long sometimes enclosed in the sheaths, the branches and branchlets spreading, the spikelets less crowded than in *S. cryptandrus*. ♃ —Gypsum sands, western Texas and New Mexico.

FIGURE 842.—Distribution of *Sporobolus cryptandrus*.

23. Sporobolus contráctus Hitchc. SPIKE DROPSEED. (Fig. 841, *D.*) Differing from *S. cryptandrus* in the spikelike panicle as much as 50 cm long, usually included at the base, rarely entirely included in the sheath. ♃ (*S. strictus* Merr.)—Mesas, dry bluffs, and sandy fields, Colorado to Nevada, south to western Texas, southeastern California, and Sonora; adventive in Maine (fig. 844).

FIGURE 843.—Distribution of *Sporobolus flexuosus*.

24. Sporobolus gigantéus Nash. GIANT DROPSEED. (Fig. 845.) Resembling *S. cryptandrus* and *S. contractus;* culms 1 to 2 m tall, erect, robust; blades as much as 1 cm wide; panicle usually thicker than in *S. contractus*, less spikelike; spikelets 2.5 to 3 mm long. ♃ —Mesas and sandhills, western Texas to Arizona.

25. Sporobolus buckléyi Vasey. (Fig. 846.) Perennial, the base strongly compressed; culms erect, slender, 40 to 80 cm tall; sheaths keeled, pubescent on the margin and collar; blades flat, 4 to 7 mm wide; panicle open, 10 to 30 cm long, the slender branches widely spreading, as much as 10 cm long, solitary, rather distant, naked below, with closely-flowered short-appressed branchlets above; spikelets about 1.5 mm long; glumes narrow, the first a little shorter, the second a little

FIGURE 844.—Distribution of *Sporobolus contractus*.

FIGURE 845.—*Sporobolus giganteus*. Panicle, × ½; glumes and floret, × 10. (Nealley, Tex.)

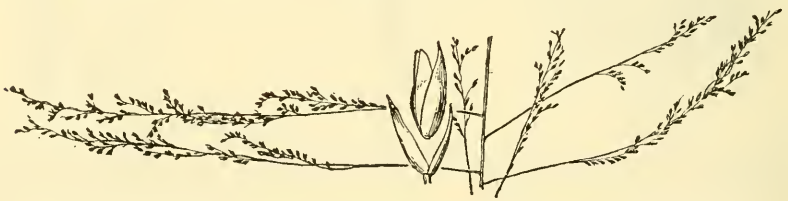

FIGURE 846.—*Sporobolus buckleyi*. Panicle, × ½; glumes and floret, × 10. (Nealley, Tex.)

FIGURE 847.—*Sporobolus airoides*. Plant, × ½; glumes and floret, × 10. (Metcalfe, N.Mex.)

longer, than the acute lemma; palea about as long as the lemma, splitting as the grain (1 mm long) ripens. 2↓ —Texas and eastern Mexico.

26. Sporobolus airoídes (Torr.) Torr. Alkali sacaton. (Fig. 847.) Perennial, in large tough bunches; culms erect to spreading, 50 to 100 cm tall; sheaths pilose at the throat; ligule pilose; blades elongate, flat, soon becoming involute, usually less than 4 mm wide, often flexuous; panicle nearly half the entire height of the plant, at maturity half to two-thirds as wide as long, the stiff slender branches and branchlets finally widely spreading, naked at base, the spikelets aggregate along the upper half to two-thirds; spikelets 2 to 2.5 mm long, the first glume about half as long, commonly falling toward maturity; second glume, lemma, and palea about equal, the palea splitting as the grain ripens. 2↓ —Meadows and valleys, especially in moderately alkaline soil, South Dakota to eastern Washington, south to Texas and southern California (fig. 848). Mature spikelets with the first glume fallen and the palea split to the base are puzzling to the beginner. Less mature complete spikelets will usually be found at the base of the panicle. A good forage grass in alkaline regions; often called bunchgrass.

Figure 848.—Distribution of *Sporobolus airoides*.

27. Sporobolus wrightii Munro. Sacaton. (Fig. 849.) Perennial, in large dense tufts; culms robust, erect, firm and hard, 1 to 2 m tall; sheaths sparsely pilose at the throat; ligule pilose; blades elongate, flat, involute in drying, 3 to 6 mm wide; panicle pale, narrow, open, mostly 30 to 60 cm long, the branches crowded, straight, stiffly ascending, the branchlets appressed, closely flowered from the base or nearly so; spikelets 2 to 2.5 mm long, the first glume about one-third as long, the second two-thirds to three-fourths as long, acute; lemma and palea about equal. 2↓ —Mesas and valleys, southern and western Texas to southern California and central Mexico (fig. 850). Useful for grazing when young; also furnishes hay and makes good winter range.

Figure 849.—*Sporobolus wrightii*. Panicle, × ½; glumes and floret, × 10. (Hitchcock 3648, Ariz.)

28. Sporobolus texánus Vasey. (Fig. 851.) Perennial, in close hemispherical tufts; culms erect to spreading, slender, wiry, 30 to 50 cm tall; sheaths pilose at the throat, the lower often papillose-pilose on the surface; blades flat, involute in drying, mostly less than 10 cm long, 1 to 4 mm wide; panicle open, rather diffuse, breaking away at maturity, 15 to 30 cm long, about as wide, the capillary scabrous branches, branchlets, and long pedicels stiffly spreading; spikelets about 2.5 mm long, the first glume acute, one-third to half as long, the second acuminate, slightly exceeding the acute lemma and palea, the palea early splitting. 2↓ —Mesas, valleys, and salt marshes, Kansas to Colorado, Texas, and New Mexico (fig. 852).

29. Sporobolus thárpii Hitchc. (Fig. 853.) Perennial, densely tufted; culms 60 to 100 cm tall; sheaths glabrous, the lower firm, loose, shining; blades elongate, involute, flexuous, about 1 mm

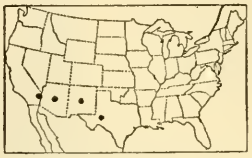

FIGURE 850.—Distribution of *Sporobolus wrightii.*

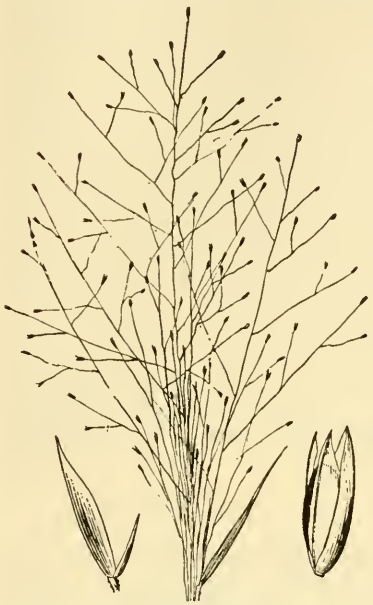

FIGURE 851.—*Sporobolus texanus.* Panicle, × ½; glumes and floret with caryopsis, × 10. (Nealley, Tex.)

FIGURE 852.—Distribution of *Sporobolus texanus.*

FIGURE 853.—*Sporobolus tharpii.* Panicle, × 1; glumes and floret, × 10. (Type.)

thick, tapering to a long fine point, long-ciliate at base; panicle open, as much as 30 cm long, the branches stiffly ascending, the lower as much as 15 cm long; spikelets appressed along the nearly simple branches and branchlets, about 3 mm long; first glume narrow, acuminate, about half as long as the spikelet, the second glume, lemma, and palea acute, about equal. ♃ —Known only from Padre Island, Tex.

77. BLEPHARONEÚRON Nash

Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes subequal, rather broad; lemma 3-nerved, the nerves densely silky villous; palea densely villous between the two nerves. Tufted perennial, with open, narrow panicles. Type species, *Blepharoneuron tricholepis.* Name from Greek *blepharis*, eyelash, and *neuron*, nerve, alluding to the villous nerves of the lemma.

1. Blepharoneuron trichólepis (Torr.) Nash. HAIRY DROPSEED. (Fig. 854.) Culms erect, densely tufted, slender, 20 to 60 cm tall; leaves crowded on the innovations, mostly less than half as long as the culm, the slender blades flat, soon becoming involute, often flexuous; panicle grayish, elliptic, 5 to 20 cm long, 2 to 5 cm wide, many-flowered, the branches ascending, the pedicels capillary, flexuous; spikelets 2.5 to 3 mm long; glumes obtuse or subacute, a little shorter than the abruptly pointed lemma; palea slightly exceeding the lemma. 2l —Rocky slopes and dry open woods, 2,000 to 3,500 m, Colorado to Utah, south to Texas, Arizona, and Mexico (fig. 855). Palatable and sufficiently abundant in places to be of importance.

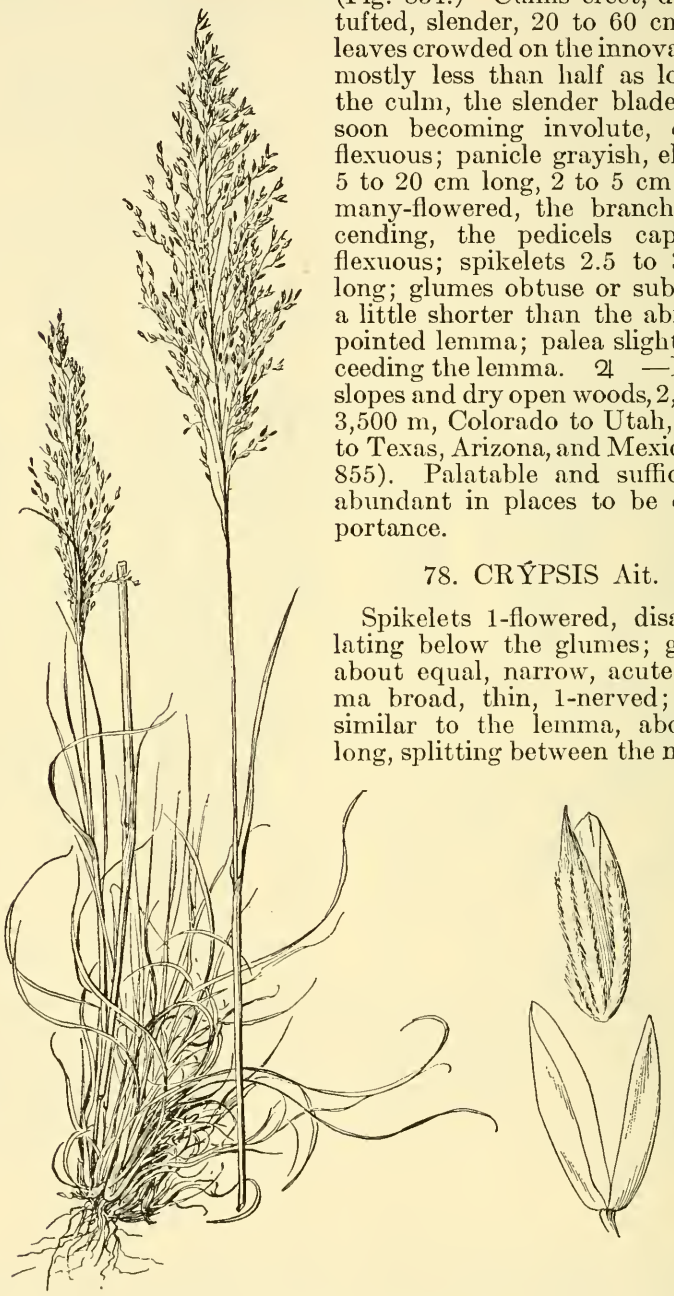

FIGURE 854.—*Blepharoneuron tricholepis*. Plant, × ½; glumes and floret, × 10. (Shear 1182, Colo.)

78. CRÝPSIS Ait.

Spikelets 1-flowered, disarticulating below the glumes; glumes about equal, narrow, acute; lemma broad, thin, 1-nerved; palea similar to the lemma, about as long, splitting between the nerves; fruit readily falling from the lemma and palea, the seed free from the

thin pericarp (easily removed when wet). Spreading annual, with capitate inflorescences in the axils of a pair of broad spathes, these being enlarged sheaths with short rigid blades. Type species, *Crypsis aculeata*. Name from Greek *krupsis*, concealment, alluding to the partially hidden inflorescence.

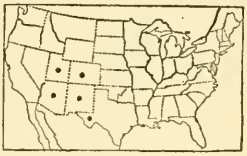

FIGURE 855.—Distribution of *Blepharoneuron tricholepis*.

1. Crypsis aculeáta (L.) Ait. (Fig. 856.) Freely branching, prostrate, the mats 30 cm in diameter, or often depauperate, 1 to 2 cm wide; blades small, sharp-pointed; heads numerous, 4 to 5 mm high, the spathes broader than long, their blades spreading; glumes about 3 mm long, minutely hispid; lemma about as long as the glumes, scabrous on the keel. ⊙ —Overflowed land of the interior valley, California; introduced from Europe.

79. HELEÓCHLOA Host

Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes about equal, narrow, acute; lemma broader, thin, 1-nerved, a little longer than the glumes; palea nearly as long as the lemma, readily splitting between the nerves. Low spreading annuals with

FIGURE 856.—*Crypsis aculeata*. Plant, × ½; glumes and floret, × 10. (Brandegee, Calif.)

oblong, dense, spikelike panicles, the subtending leaves with inflated sheaths and reduced blades. Type species, *Heleochloa alopecuroides*. Name from Greek *helos*, marsh, and *chloa*, grass, alluding to the habitat of the type species.

1. Heleochloa schoenoídes (L.) Host. (Fig. 857, *A*.) Culms tufted, branching, erect to spreading and geniculate, 10 to 30 cm long; sheaths often somewhat inflated; blades flat, with involute slender tips, mostly less than 10 cm long, 2 to 4 mm wide; panicle pale, 1 to 4 cm

long, 8 to 10 mm thick; spikelets about 3 mm long. ⊙ —Waste

FIGURE 857.—*A, Heleochloa schoenoides.* Plant, × ½; spikelet and floret, × 5. (Smith, Pa.) *B, H. alopecuroides,* × 5. (Burk, Pa.)

places, Massachusetts to Delaware, Michigan, and Illinois (fig. 858); introduced from Europe.

Heleochloa alopecuroides (Pill. and Mitterp.) Host. (Fig. 857, *B.*) Differing from *H. schoenoides* in the more slender panicles, 4 to 5 mm thick, exserted at maturity; spikelets about 2 mm long. ⊙ —Ballast, Philadelphia and near Portland, Oreg. Europe.

FIGURE 858.—Distribution of *Heleochloa schoenoides.*

FIGURE 859.—*Brachyelytrum erectum*. Plant, × ½; branchlet with glumes of two spikelets, and floret, × 5 (Bissell, Conn.)

80. BRACHYÉLYTRUM Beauv.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, prolonged behind the palea as a slender naked bristle; glumes minute, the first often obsolete, the second sometimes awned; lemma firm, narrow, 5-nerved, the base extending into a pronounced oblique callus, the apex terminating in a long straight scabrous awn. Erect, slender perennials with short knotty rhizomes, flat blades, and narrow, rather few-flowered panicles. Type species, *Brachyelytrum erectum*. Name from Greek *brachus*, short, and *elutron*, cover or husk, alluding to the short glumes.

1. Brachyelytrum erĕctum (Schreb.) Beauv. (Fig. 859.) Culms 60 to 100 cm tall; sheaths sparsely retrorse-hispid, rarely glabrous; blades mostly 7 to 15 cm long, 1 to 1.5 cm wide, scabrous, sparingly pilose beneath, at least on the nerves and margin; panicle 5 to 15 cm long, the short branches appressed; second glume 0.5 to 2 mm long; lemma subterete, about 1 cm long, scabrous, the nerves sometimes hispid, the awn 1 to 3 cm long. ♃ —Moist or rocky woods, Newfoundland to Minnesota, south to Georgia and Oklahoma (fig. 860).

FIGURE 860.—Distribution of *Brachyelytrum erectum*.

81. MÍLIUM L.

Spikelets 1-flowered, disarticulating above the glumes; glumes

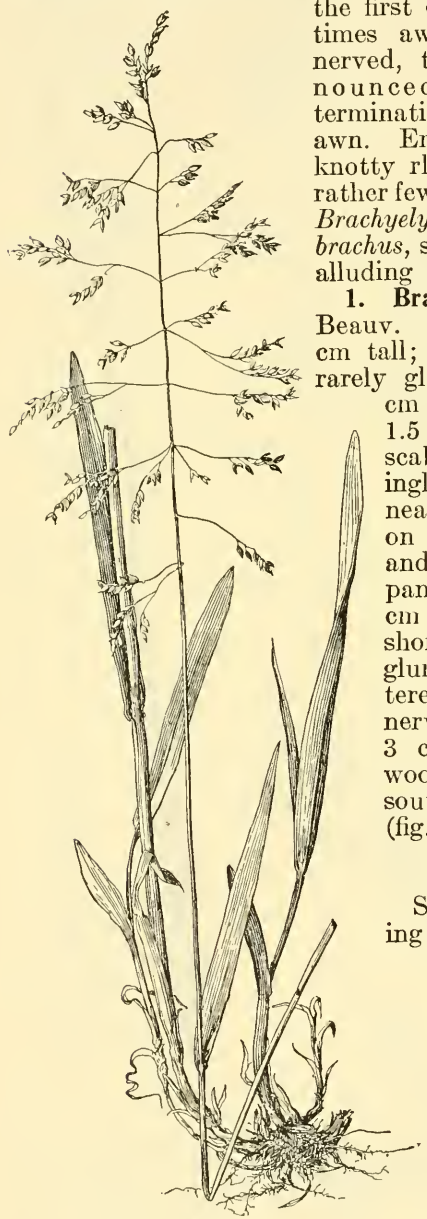

FIGURE 861.—*Milium effusum*. Plant, × ½; spikelet and floret, × 5. (Phillips, Maine.)

equal, obtuse, membranaceous, rounded on the back; lemma a little shorter than the glumes, obtuse, obscurely nerved, rounded on the back, dorsally compressed, in fruit becoming indurate, smooth and

shining, the margins enclosing the lemma as in *Panicum*. Moderately tall grasses with flat blades and open panicles. Type species, *Milium effusum*. *Milium*, old Latin name for millet.

1. Milium effúsum L. (Fig. 861.) Smooth perennial, somewhat succulent; culms slender, erect from a bent base, 1 to 1.5 m tall; blades mostly 10 to 20 cm long, flat, lax, 8 to 15 mm wide; panicle 10 to 20 cm long, the slender branches in remote spreading or drooping pairs or fascicles, naked below; spikelets pale, 3 to 3.5 mm long; glumes scaberulous. 2—Damp or rocky woods, Quebec and Nova Scotia to Minnesota, south to Maryland and Illinois (fig. 862); Eurasia.

82. ORYZÓPSIS Michx. Ricegrass

Spikelets 1-flowered, disarticulating above the glumes; glumes about equal, obtuse to acuminate; lemma indurate, usually about as long as the glumes, broad, oval or oblong, nearly terete, usually pubescent, with a short, blunt, oblique callus, and a short deciduous, sometimes bent and twisted awn; palea enclosed by the edges of the lemma. Mostly slender perennials, with flat or often involute blades and terminal narrow or open panicles. Type species, *Oryzopsis asperifolia*. Name from *oruza*, rice, and *opsis*, appearance, alluding to a fancied resemblance to rice.

FIGURE 862.—Distribution of *Milium effusum*.

Nearly all the species are highly palatable to stock, but are usually not in sufficient abundance to be of importance, except *O. hymenoides* (Indian ricegrass), which is common in the arid and semiarid regions of the West and furnishes much feed. The seed has been used for food by the Indians. Locally important may be *O. micrantha* in the Black Hills region and *O. kingii* in the high Sierras. *O. miliacea* is sometimes cultivated for forage in California.

Lemma smooth (rarely pubescent in *O. micrantha*).
  Blades flat, 5 mm wide or more. Spikelets numerous, about 3 mm long. 1. O. MILIACEA.
  Blades more or less involute, less than 2 mm wide.
    Panicle branches spreading or reflexed; fruit about 2 mm long, pale. 2. O. MICRANTHA.
    Panicle branches ascending or appressed; fruit about 4 mm long, dark brown. 3. O. HENDERSONI.

Lemma pubescent.
  Pubescence on lemma long and silky.
    Panicle-branches and the capillary pedicels divaricately spreading. 12. O. HYMENOIDES.
    Panicle-branches and pedicels erect or ascending.
      Awn 6 mm long; culms usually not more than 30 cm tall. 11. O. WEBBERI.
      Awn 12 mm long; culms 30 to 60 cm tall---------- 10. O. BLOOMERI.
  Pubescence on lemma short, appressed.
    Spikelets, excluding awn, 6 to 9 mm long; blades flat.
      Basal blades elongate, uppermost not more than 1 cm long. 8. O. ASPERIFOLIA.
      Basal blades reduced, upper elongate---------- 9. O. RACEMOSA.
    Spikelets, excluding awn, 5 mm long or less; blades involute or subinvolute.
      Panicle branches erect or appressed.
        Blades and panicle stiff, erect; awns about 5 mm long_ 4. O. EXIGUA.
        Blades flexuous, the panicle somewhat so; awns at least 10 mm long. 7. O. KINGII.
      Panicle branches loosely ascending or spreading.
        Awn not more than 2 mm long, straight or nearly so_ 5. O. PUNGENS.
        Awn 10 to 20 mm long, weakly twice-geniculate__ 6. O. CANADENSIS.

1. Oryzopsis miliácea (L.) Benth. and Hook. (Fig. 863.) Culms relatively stout, sometimes branching, erect from a decumbent base, 60 to 150 cm tall; ligule about 2 mm long; blades flat, 8 to 10 mm wide; panicle 15 to 30 cm long, loose, the branches spreading with numerous short-pediceled spikelets beyond the middle; glumes acuminate, 3 mm long; lemma smooth, 2 mm long, the straight awn about 4 mm long. 2l —Introduced in a few localities in California; ballast, Camden, N.J., and Philadelphia, Pa.; Mediterranean region.

2. Oryzopsis micrantha (Trin. and Rupr.) Thurb. LITTLESEED RICEGRASS. (Fig. 864.) Culms densely tufted, erect, slender, 30 to 70 cm tall; ligule about 1 mm long; blades slender, scabrous, flat or involute, 0.5 to 2 mm wide; panicle open, 10 to 15 cm long, the branches distant, single or in pairs, spreading or finally reflexed, 2 to 5 cm long, with short-pediceled appressed spikelets toward the ends; glumes thin, acuminate, 3 to 4 mm long; lemma elliptic, glabrous, or rarely appressed-pilose, 2 to 2.5 mm long, yellow or brown, the straight awn 5 to 10 mm long. 2l —Open dry woods and rocky slopes, medium altitudes, Saskatchewan to Montana, south to New Mexico and Arizona (fig. 865). The form with pilose lemmas is found from Colorado to Arizona.

FIGURE 863.—*Oryzopsis miliacea*, × 5. (Kralik, Europe.)

FIGURE 864.—*Oryzopsis micrantha*. Panicle, × 1; floret × 5. (Hitchcock 22993, N. Mex.)

3. Oryzopsis hendersóni Vasey. (Fig. 866.) Culms densely tufted, scabrous, 10 to 40 cm tall; leaves mostly basal, the sheaths broad, papery, glabrescent; ligule very short; blades subfiliform, involute, scabrous, firm, mostly less than 10 cm long, the one or two culm blades 4 to 5 cm long; panicle few-flowered, 5 to 12 cm long, the few scabrous branches appressed or ascending, spikelet-bearing toward the ends, the lower as much as 8 cm long; spikelets short-pediceled; glumes abruptly acute, 5 to 6 mm long; lemma nearly as long as the glumes, glabrous, dark brown at maturity, the awn early deciduous, nearly straight, 6 to 10 mm long. 2l —Dry or gravelly soil. Known only from Mount Clements, Wash., and from the Ochoco National Forest, Oreg.

FIGURE 865.—Distribution of *Oryzopsis micrantha*.

4. Oryzopsis exígua Thurb. LITTLE RICEGRASS. (Fig. 867.) Culms densely tufted, stiffly erect, scabrous, 15 to 30 cm tall; sheaths smooth or somewhat scabrous; ligule 2 to 3 mm long; blades involute-filiform, stiffly erect, scabrous, 5 to 10 cm long, the culm blades about

2, shorter; panicle narrow, 3 to 6 cm long, the branches appressed, the lower 1 to 2 cm long; spikelets short-pediceled, glumes abruptly acute, 4 mm long; lemma appressed-pilose, about as long as the glumes, the awn about 5 mm long, not twisted, geniculate. 2l —Dry open

FIGURE 866.—*Oryzopsis hendersoni.* Plant, × ½; spikelet and floret, × 5. (Type.)

FIGURE 867.—*Oryzopsis exigua.* Panicle, × 1; floret, × 5. (Nelson 6511, Wyo.)

ground or open woods, at moderately high altitudes, Montana to Washington, south to Colorado, Oregon, and Nevada (fig. 868).

5. Oryzopsis púngens (Torr.) Hitchc. (Fig. 869.) Culms tufted, erect, slender, 20 to 50 cm tall; blades elongate, slender, flat or involute, less than 2 mm wide; panicle narrow, 3 to 6 cm long, the branches erect or ascending or spreading in anthesis; spikelets long-pediceled; glumes 3 to 4 mm long, obscurely 5-nerved, obtuse; lemma about as long as the glumes, rather densely pubescent, the awn usually 1 to 2 mm long. 2l —Sandy or rocky soil, Labrador to British Columbia, south to Connecticut, Indiana, South Dakota, and Colorado (fig 870).

FIGURE 868.—Distribution of *Oryzopsis exigua.*

6. Oryzopsis canadénsis (Poir.) Torr. (Fig. 871.) Culms slender, tufted, erect, 30 to 70 cm tall; ligule about 2 mm long; blades flat to involute, scabrous; panicle open, 5 to 10 cm long, the slender flexuous branches ascending or spreading, naked below, few-flowered above;

spikelets long-pediceled; glumes 4 to 5 mm long, abruptly acute; lemma about 3 mm long, rather sparsely appressed-pilose, the awn 1 to 2 cm long, weakly twice geniculate. 2l —Woods and thickets, Newfoundland to Alberta, south to New Hampshire, New York, northern Michigan, and northern Minnesota (fig. 872).

FIGURE 869.—*Oryzopsis pungens.* Panicle, × 1; floret, × 5. (Grout, Vt.)

FIGURE 870.—Distribution of *Oryzopsis pungens.*

FIGURE 872.—Distribution of *Oryzopsis canadensis.*

7. Oryzopsis kíngii (Boland.) Beal. (Fig. 873.) Culms tufted, slender, 20 to 40 cm tall; leaves numerous at the base, the blades involute, filiform, flexuous; ligule about 1 mm long; panicle narrow, loose, the short slender branches appressed or ascending, few-flowered; spikelets rather short-pediceled; glumes broad, papery, nerveless, obtuse, purple at base, the first about 3.5 mm long, the second a little longer; lemma elliptic, 3 to 3.5 mm long, rather sparingly appressed-pubescent; awn bent in a wide curve or indistinctly geniculate below the middle, not twisted, minutely pubescent, about 12 mm long, not readily deciduous. 2l —Meadows at upper altitudes, central Sierra Nevada, Calif.

FIGURE 873.—*Oryzopsis kingii.* Plant, × 1; floret, × 5. (Bolander 6097, Calif.)

8. Oryzopsis asperifólia Michx. (Fig. 874.) Culms tufted, the innovations erect, the fertile culms widely spreading or prostrate, 20 to 70 cm long, nearly naked, the two or three sheaths bearing reduced or obsolete blades; basal blades erect, firm, scabrous, flat to somewhat revolute, elongate, 3 to 8 mm wide, tapering toward each end, glaucous beneath; panicle nearly simple, rather few-flowered, 5 to 8 cm long, the branches appressed; spikelets on appressed pedicels 3 to 6 mm long; glumes 6 to 8 mm long, somewhat obovate, about 7-nerved, abruptly pointed or apiculate; lemma about as long as the glumes, sparingly pubescent, more densely so on the callus, pale or yellowish at maturity, the awn 5 to 10 mm long. 2l —Wooded slopes and

FIGURE 871.—*Oryzopsis canadensis.* Panicle, × 1; floret, × 5. (Rand, Maine.)

FIGURE 874.—*Oryzopsis asperifolia.* Plant, ×½; spikelet and floret, × 5. (Amer. Gr. Nat. Herb. 834.)

dry banks, Newfoundland to British Columbia and Montana, south to Connecticut, Indiana, South Dakota, and New Mexico (fig. 875).

9. Oryzopsis racemósa (J. E. Smith) Ricker. (Fig. 876.) Culms tufted, from a knotty rhizome, erect, 30 to 100 cm tall; culm leaves several, the lowermost blades reduced, the others elongate, flat, 5 to 15 mm wide, tapering at both ends, rather thin, scabrous above, pubescent beneath; panicle 10 to 20 cm long, the branches distant, the lower spreading or reflexed at maturity, bearing a few spikelets toward the end; glumes 7 to 9 mm long, about 7-nerved, abruptly acuminate; lemma slightly shorter than the glumes sparsely pubescent, nearly black at maturity, the awn 1.5 to 2.5 cm long, slightly flexuous. 2l —Rocky woods, Quebec to Minnesota and South Dakota, south to Delaware, Kentucky, and Iowa (fig. 877).

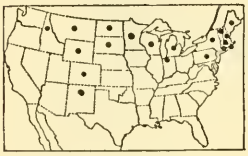

FIGURE 875.—Distribution of *Oryzopsis asperifolia.*

FIGURE 876.—*Oryzopsis racemosa.* Panicle, × ½; floret, × 5. (Sartwell, N.Y.)

10. Oryzopsis blooméri (Boland.) Ricker. (Fig. 878.) Culms tufted, 30 to 60 cm tall; leaves crowded at the base; ligule about 1 mm long; blades narrow, involute, firm; panicle 7 to 15 cm long, the branches slender, rather stiffly ascending, the longer 5 to 7 cm long, spikelet-bearing from about the middle; spikelets rather long-pediceled; glumes broad, indistinctly 3- to 5-nerved, rather abruptly acuminate, 8 to 10 mm long; lemma elliptic, 5 mm long, densely long-villous; awn about 12 mm long, tardily deciduous, slightly twisted and appressed-villous below, weakly geniculate. 2l —Dry ground, medium altitudes, Montana to eastern Washington, south to New Mexico and California, rather rare (fig. 879).

FIGURE 878.—*Oryzopsis bloomeri.* Panicle, × 1; floret, × 5. (Sandberg and Leiberg 231, Wash.)

FIGURE 877.—Distribution of *Oryzopsis racemosa.*

11. Oryzopsis webbéri (Thurb.) Benth. (Fig. 880.) Culms densely tufted, erect, 15 to 30 cm tall; blades involute, filiform, scabrous; panicle narrow, 2.5 to 5 cm long, the branches appressed; glumes about 8 mm long, narrow, obscurely 5-nerved, minutely scaberulous, acuminate; lemma narrow, 6 mm long, densely long-pilose, the awn about 6 mm long, straight or bent, not twisted. 2l —Deserts and plains, Colorado, Nevada, and California.

12. Oryzopsis hymenoídes (Roem. and Schult.) Ricker. INDIAN RICEGRASS. (Fig. 881.) Culms densely tufted, 30 to 60 cm tall; ligule about 6 mm long, acute; blades slender, involute, nearly as long as the culms; panicle diffuse, 7 to 15 cm long, the slender branches in pairs, the branchlets dichotomous, all divaricately spreading, the ultimate pedicels capillary, flexuous; glumes about 6 to 7 mm long, puberulent to glabrous, rarely hirsute, papery, ovate, 3- to 5-nerved, abruptly pointed; lemma fusiform, turgid, about 3 mm long, nearly black at maturity, densely long-pilose with white hairs 3 mm long; awn about 4 mm long, straight, readily deciduous. 2↓ — Deserts and plains, medium altitudes, Manitoba to British Columbia, south to Texas, California, and northern Mexico (fig. 882).

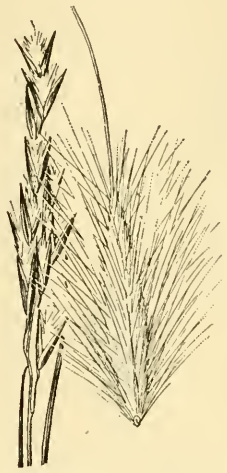

FIGURE 880.—*Oryzopsis webberi*. Panicle, × 1; floret, × 5. (Hillman, Nev.)

FIGURE 879.—Distribution of *Oryzopsis bloomeri*.

Nassélla májor (Trin. & Rupr.) Desv. Slender tufted perennial; blades narrow, flat or loosely involute; panicle narrow, 3 to 5 cm long, the few branches appressed, 1 to 1.5 cm long; glumes 4 mm long, awn-pointed; mature lemma flattish, obovate-oblong, gibbous at apex, smooth and shining, 2 mm long; awn geniculate, 1 cm long, soon deciduous.—Ballast, Portland, Oreg. Introduced from Chile.

FIGURE 881.—*Oryzopsis hymenoides*. Panicle, × 1; floret, × 5. (Mearns 2583, Wyo.)

83. PIPTOCHAÉTIUM Presl

Spikelets 1-flowered, disarticulating above the glumes, the callus of the floret short, acutish, usually bearded; glumes about equal, broad, ovate, convex on the back, thin, abruptly acuminate; fruit brown or

FIGURE 882.—Distribution of *Oryzopsis hymenoides*.

dark gray, coriaceous, obovate, shorter than the glumes, glabrous or hispid above the callus, often minutely striate, sometimes tuberculate near the summit, the lemma turgid, usually somewhat compressed and keeled on the back, gibbous near the summit back of the awn, the edges not meeting but clasping the sulcus of the palea,

FIGURE 883.—*Piptochaetium fimbriatum*. Plant, × ½; glumes, floret and palea, × 5. (Hitchcock 13511, N.Mex.)

the summit sometimes expanded into a crown; awn deciduous or persistent, curved, flexuous or geniculate, often twisted below; palea narrow, indurate, except toward the margins, central keel consisting of two nerves and a narrow channel or sulcus between, the apex of the keel projecting above the summit of the lemma as a minute point. Tufted perennials with narrow usually involute blades and rather few-flowered panicles. Type species, *Piptochaetium setifolium* Presl. Name from Greek *piptein*, to fall, and *chaite*, bristle, alluding to the deciduous awns of the type species.

1. Piptochaetium fimbriátum (H.B.K.) Hitchc. PINYON RICEGRASS. (Fig. 883.) Culms densely tufted, erect, slender, 40 to 80 cm tall; blades involute-filiform, flexuous, elongate; panicle open, 5 to 15 cm long, the slender branches spreading, few-flowered toward the ends; spikelets long-pediceled; glumes about 5 mm long, abruptly acuminate, 7-nerved; lemma a little shorter than the glumes, appressed-pubescent, especially on the callus, dark brown at maturity with a circular ridge at the base of the awn; awn weakly twice geniculate, 1 to 2 cm long. 2↓ (*Oryzopsis fimbriata* Hemsl.)—Open rocky woods, Colorado to western Texas, Arizona, and Mexico (fig. 884). A fine forage grass.

FIGURE 884.—Distribution of *Piptochaetium fimbriatum*.

84. STÍPA L. NEEDLEGRASS

Spikelets 1-flowered, disarticulating above the glumes, the articulation oblique, leaving a bearded, sharp-pointed callus attached to the base of the floret; glumes membranaceous, often papery, acute, acuminate, or even aristate, usually long and narrow; lemma narrow, terete, firm or indurate, strongly convolute, rarely the margins only meeting, terminating in a prominent awn, the junction of body and awn evident, the awn twisted below, geniculate, usually persistent; palea enclosed in the convolute lemma. Tufted perennials, with usually convolute blades and mostly narrow panicles. Type species, *Stipa pennata* L. Name from Greek *stupe*, tow, alluding to the feathery awns of the type species.

The species are for the most part valuable forage plants. Several, all western, such as *Stipa comata*, *S. occidentalis*, *S. lemmoni*, and *S. neomexicana*, are grazed chiefly when young. *Stipa lettermani* is important at high altitudes, in the mountains of the West; *S. columbiana* at medium altitudes; *S. viridula* in the Rocky Mountains; *S. pulchra*, *S. thurberiana*, and *S. speciosa* in California. Some of the species, when mature, particularly *S. spartea* and *S. comata*, are injurious, especially to sheep, because of the hard sharp points to the fruits which penetrate the skin. Sleepy grass, *S. robusta*, acts as a narcotic (see p. 436). One of the Old World species, *S. tenacissima* L., furnishes a part of the esparto or alfa grass of Spain and Algeria that in used in the manufacture of paper and cordage (see p. 439).

1a. Terminal segment of awn plumose.
  Awn 12 to 18 cm long ..... 1. S. NEOMEXICANA.
  Awn 1.2 to 1.5 cm long ..... 15. S. PORTERI.
1b. Terminal segment of awn not plumose.
  2a. First segment of the once-geniculate awn strongly plumose, the ascending hairs 5 to 8 mm long ..... 2. S. SPECIOSA.
  2b. First segment of awn sometimes plumose but the hairs not more than 2 mm long.

3a. Mature lemma 2 to 3 mm long. Awn capillary, flexuous, about 5 cm long---------- 32. S. TENUISSIMA.
3b. Mature lemma at least 5 mm long.
4a. Lemma densely appressed-villous with white hairs 3 to 4 mm long, rising above the summit in a pappuslike crown------ 5. S. CORONATA.
4b. Lemma often villous but the hairs not more than 1 mm long, or sometimes those at the summit as much as 2 mm long.
5a. Summit of mature lemma smooth, cylindric, whitish, forming a ciliate crown 0.5 to 1 mm long (see also *S. pulchra*). 3. S. LEUCOTRICHA.
5b. Summit of mature lemma not forming a crown.
6a. Lemma 2-lobed at summit, the lobes extending into awns 2 to 3 mm long on each side of the central awn---- 4. S. STILLMANII.
6b. Lemma not lobed at summit or only slightly so.
7a. Awn plumose below, the hairs ascending or spreading (compare *S. pulchra*, with appressed-hispid awn).
Sheaths pubescent.
Awns once or obscurely twice-geniculate-- 22. S. CURVIFOLIA.
Awns distinctly twice geniculate.
Lemmas 6 to 7 mm long; glumes thin----- 17. S. ELMERI.
Lemmas 8 to 9 mm long; glumes firm-- 18. S. LATIGLUME.
Sheaths glabrous.
Ligule 3 to 6 mm long---------- 16. S. THURBERIANA.
Ligule very short.
Hairs on upper part of the lemma much longer than those below---------- 21. S. CALIFORNICA.
Hairs short all over the lemma------ 19. S. OCCIDENTALIS.
7b. Awn scabrous or nearly glabrous, rarely appressed-hispid, not plumose.
8a. Lemma more than 7 mm (often 1 to 2 cm) long, glabrous or sparsely pubescent above the callus, mostly cylindric (somewhat fusiform in *S. pulchra*).
Mature lemma pale or finally brownish, sparsely pubescent to summit, mostly more than 1 cm long-- 10. S. COMATA.
Mature lemma dark.
Lemma 8 to 10 mm long.
Glumes 3-nerved. Summit of lemma hispidulous-ciliate, the hairs erect, nearly 1 mm long; lemma somewhat fusiform, pubescent in lines above the callus. 11. S. PULCHRA.
Glumes 5- to 9-nerved.
Lemmas glabrous above the base, minutely roughened at apex; callus with fine sharp point. 8. S. AVENACEA.
Lemmas sparsely pubescent to apex; callus rather blunt---------- 12. S. PRINGLEI.
Lemma 12 to 25 mm long, cylindric.
Mature lemma glabrous above the callus. 7. S. AVENACIOIDES.
Mature lemma more or less pubescent above the callus. 9. S. SPARTEA.
8b. Lemma less than 7 mm long, or if as long as 7 to 8 mm, distinctly pubescent on the upper part.
Panicle open, the branches spreading or ascending, naked at base.
Panicle diffuse, the branches divergent, drooping; lemma about 5 mm long; awn about 2 cm long. 6. S. RICHARDSONI.
Panicle open but not diffuse.
Ligule 3 to 6 mm long; awn about 5 cm long, the terminal segment flexuous---------- 13. S. EMINENS.
Ligule 1 mm long or less; awn 2.5 to 4 cm long. 14. S. LEPIDA
Panicle narrow, the branches appressed.
Hairs on lemma copious, at least at summit, 2 mm long.
Lemmas evenly villous all over; summit with lobes 0.8 to 1.5 mm long---------- 20. S. LOBATA.
Lemmas conspicuously villous above, less so below; summit not lobed or obscurely so.

Lemma about 8 mm long, villous at summit, pubescent below---------- 23. S. SCRIBNERI.
Lemma about 5 mm long, villous all over but more so above---------- 30. S. PINETORUM.
Hairs not copious, usually not more than 1 mm long at summit.
Glumes broad, abruptly acuminate, rather firm, the first 5-nerved---------- 24. S. LEMMONI.
Glumes narrow, gradually acuminate, usually hyaline, the first usually 3-nerved.
Awn 4 to 6 cm long, obscurely geniculate, the terminal segment flexuous---------- 31. S. ARIDA.
Awn mostly less than 5 cm long, if as much as 4 cm long, twice-geniculate and the terminal segment straight or nearly so.
Sheaths, at least the lowermost, pubescent. 29. S. WILLIAMSII.
Sheaths glabrous.
Sheaths villous at the throat; fruit rather turgid, the callus broad and short; lower nodes of panicle villous.
Glumes thin, papery; plants rather slender, mostly less than 1 m tall; panicle rather slender, open---------- 25. S. VIRIDULA.
Glumes firm, the nerves inconspicuous; plants robust, mostly more than 1 m tall; panicle larger, more compact---- 26. S. ROBUSTA.
Sheaths not villous at the throat or only slightly so; fruit slender, the callus narrow, sharp-pointed; nodes of panicle glabrous or nearly so.
Awn mostly more than 2 cm long; hairs at summit of lemma about as long as the others. 27. S. COLUMBIANA.
Awn mostly less than 2 cm long; hairs at summit of lemma longer than those on the body 1 to 1.5 mm long----- 28. S. LETTERMANI'

1. Stipa neomexicána (Thurb.) Scribn. NEW MEXICAN FEATHERGRASS. (Fig. 885.) Culms mostly 40 to 80 cm tall; sheaths glabrous or the lower minutely pubescent; ligule very short, ciliate; blades slender, firm, convolute, glabrous beneath, the basal 10 to 30 cm long, scarcely 1 mm wide when unrolled; panicle narrow, 3 to 8 cm long; spikelets pale, more or less shining; glumes 3 to 5 cm long, tapering to a fine point; lemma about 15 mm long including the pilose callus 4 to 5 mm long; awn readily deciduous, 12 to 18 cm long, the lower one-fourth to one-third straight, strongly twisted, appressed-villous, the middle segment 1 to 2 cm long, the terminal segment flexuous, plumose, the hairs about 3 mm long. 2↓ —Mesas, canyons, and rocky slopes, western Texas and Colorado to Utah and Arizona (fig. 886).

2. Stipa speciósa Trin. and Rupr. DESERT NEEDLEGRASS. (Fig. 887.) Culms numerous, 30 to 60 cm tall; sheaths brownish, smooth or the lower pubescent or even felty at the very base, the throat densely short-villous; ligule short; blades elongate, involute-filiform, mostly basal, more or less deciduous from the outer and older persistent sheaths; panicle narrow, dense, 10 to 15 cm long, not much exceeding the leaves, white or tawny, feathery from the plumose awns; glumes smooth, 14 to 16 mm long, 3-nerved, long-acuminate, papery; lemma 7 to 9 mm long, narrow, densely short-pubescent, the callus sharp and smooth below; awn with one sharp bend, the first section 1.5 to 2 cm long, densely long-pilose on the lower half or two-thirds, the hairs 5 to 8 mm long, the remaining portion of the awn

scabrous, the second segment about 2.5 cm long. ♃ —Deserts, canyons, and rocky hills, Colorado to southern California; southern South America (fig. 888).

3. Stipa leucótricha Trin. and Rupr. TEXAS NEEDLEGRASS. (Fig. 889.) Culms 30 to 60 cm tall, the nodes pubescent; blades 10 to 30 cm long, flat, often becoming involute, hispidulous beneath, 2 to 4 mm wide; panicle narrow, mostly not more than 10 cm long; glumes 12 to 18 mm long; lemma about 1 cm long, the slender callus about 4 mm long, the body oblong, brownish, appressed-pubescent on the lower part, papillose-roughened at least toward the summit, abruptly narrowed into a cylindric smooth neck about 1 mm long, the crown ciliate with short stiff hairs; awn 6 to 10 cm long, rather stout, twice-geniculate, the first segment hispidulous, twisted, 2 to 3.5 cm long. ♃ —Dry, open grassland, Oklahoma to central Mexico. Cleistogamous spikelets with glumes obsolete and lemma nearly awnless are borne in basal sheaths just after maturity of panicle.

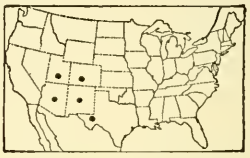

FIGURE 886.—Distribution of *Stipa neomexicana*.

FIGURE 885.—*Stipa neomexicana*. Plant, × ½; lemma, × 5. (Jones 5377, Utah.)

FIGURE 887.—*Stipa speciosa*. Panicle, × ½; floret, × 5. (Reed 4853, Calif.)

4. Stipa stillmanii Boland. (Fig. 890.) Culms stout, 60 to 100 cm tall; sheaths smooth, puberulent at the throat and collar; ligule very short; blades elongate, scattered, folded or involute, firm, the uppermost filiform; panicle 10 to 20 cm long, narrow, dense or interrupted at base, the branches short, fascicled; glumes equal, 14 to 16 mm long, papery, minutely scabrous, acuminate into a scabrous

awn-point, the first 3-nerved, the second 5-nerved; lemma 9 mm long, short-pilose, bearing 2 slender teeth at the apex, the callus short; awn about 2.5 cm long, once- or indistinctly twice-geniculate, scabrous. 2↓ —Rocky slopes, Sierra Nevada, from Lassen National Forest to Tahoe National Forest, Calif.; apparently rare.

5. Stipa coronáta Thurb. (Fig. 891.) Culms stout, 1 to 2 m tall, as much as 6 mm thick at base, smooth or pubescent below the nodes; sheaths smooth, the margin and throat villous; ligule about 2 mm long, ciliate; blades elongate, 4 to 6 mm wide, flat to subinvolute with a slender involute point; panicle 30 to 40 cm long, contracted, erect, purplish; glumes gradually acuminate, 3-nerved, the first about 2 cm long, the second 2 to 4 mm shorter; lemma about 8 mm long, densely villous with long appressed hairs 3 to 4 mm long; awn usually 4 to 5 cm long, scabrous, twice-geniculate, the first and second segments about 1 cm long. 2↓ —Open ground in the Coast Range, California, from Monterey to Baja California.

FIGURE 888.—Distribution of *Stipa speciosa*.

STIPA CORONATA var. DEPAUPERÁTA (Jones) Hitchc. Culms usually 30 to 50 cm tall; blades 10 to 20 cm long; panicle 10 to 15 cm long, rather few-flowered, the spikelets commonly smaller than in the species, the lemma 6 to 7 mm long, the awn about 2.5 cm long, once-geniculate, the first segment twisted and scabrous-pubescent, about 1 cm long, the second segment bent about horizontally. 2↓ — Dry or rocky slopes, Utah and Nevada to Arizona and southern California. Many intermediates occur between the variety and the species.

FIGURE 889.—*Stipa leucotricha*. Floret, × 1; lemma, × 5. (Hitchcock 5138, Tex.)

FIGURE 890.—*Stipa stiltmani*. Floret, × 1; lemma, × 5. (Bolander, Calif.)

FIGURE 891.—*Stipa coronata*. Floret, × 1; lemma, × 5. (Orcutt 1068, Calif.)

6. Stipa richardsóni Link. RICHARDSON NEEDLEGRASS. (Fig. 892.) Culms 50 to 100 cm tall; blades mostly basal, usually 15 to 25

cm long, involute, subfiliform, scabrous; panicle 10 to 20 cm long,

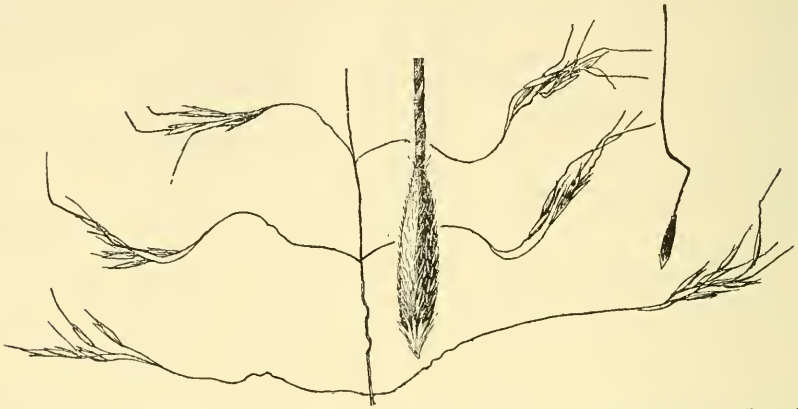

FIGURE 892.—*Stipa richardsoni*. Panicle, × ½; floret, × 1; lemma, × 5. (Hitchcock 11468, Alberta.)

open, the branches slender, distant, spreading or drooping, naked below; glumes 8 to 9 mm long; lemma about 5 mm long, subfusiform, brown at maturity; awn 2.5 to 3 cm long. 2↓ —Bottom lands and wooded slopes, Saskatchewan to Colorado and British Columbia (fig. 893).

FIGURE 893.—Distribution of *Stipa richardsoni*.

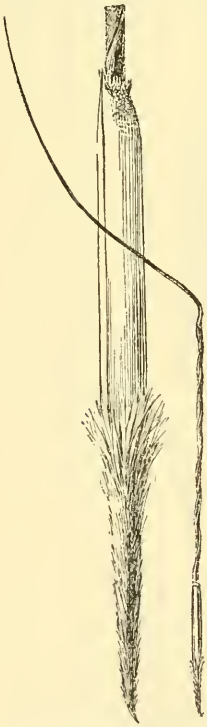

FIGURE 894.—*Stipa avenacioides*. Floret, × 1; lemma, × 5. (Curtiss 5834, Fla.)

7. Stipa avenacioídes Nash. (Fig. 894.) Culms about 1 m tall; ligule 2 to 3 mm long; blades elongate, involute, subfiliform; panicle 10 to 25 cm long, open, the branches slender, spreading, naked below; glumes about 2 cm long; lemma brown, linear, 1.5 to 2 cm long including the callus 7 mm long, the body glabrous, minutely papillose at the slightly contracted summit, slightly hispidulous on the crown; awn 8 to 11 cm long, scabrous, twice geniculate. 2↓ —Dry pine woods, peninsular Florida.

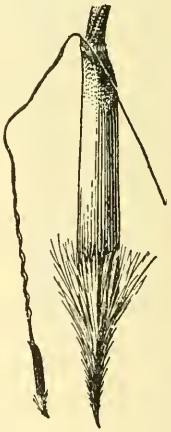

FIGURE 895.—*Stipa avenacea*. Floret, × 1; lemma, × 5. (Kneucker, Gram. 564, Md.)

8. Stipa avenácea L. BLACKSEED NEEDLEGRASS. (Fig. 895.) Culms 60 to 100 cm tall; ligule about 3 mm long; blades 20 to 30 cm long, 1 mm wide, flat or involute; panicle 10 to 15 cm long, open, the slender branches 2 to 4 cm long, bearing 1 or 2 spikelets; glumes 1.5 cm long; lemma dark brown, 9 to 10 mm long, the

FIGURE 896.—Distribution of *Stipa avenacea*.

FIGURE 897.—*Stipa spartea*. Plant, × ½; glumes and floret, × 2. (McDonald 16, Ill.)

callus 2 mm long, the body glabrous, papillose-roughened toward the summit, awn scabrous, 4.5 to 6 cm long, twice-geniculate. 2l —Dry or rocky open woods, Massachusetts to Michigan south to Florida and Texas, mostly on the Coastal Plain (fig. 896).

FIGURE 898.—Distribution of *Stipa spartea*.

9. Stipa spártea Trin. PORCUPINE GRASS. (Fig. 897.) Culms about 1 m tall; ligule rather firm, 4 to 5 mm long; blades 20 to 30 cm long, 3 to 5 mm wide, flat, involute in drying; panicle 15 to 20 cm long, narrow, nodding, the few slender branches bearing 1 or 2 spikelets; glumes 3 to 4 cm long; lemma subcylindric, brown, 1.6 to 2.5 cm long, the callus about 7 mm long, the body pubescent below, glabrous above except for a line of pubescence on one side, the crown erect-ciliate; awn stout, 12 to 20 cm long, twice geniculate. 2l —Prairies, Ontario to British Columbia, south to Pennsylvania, Indiana, Kansas, and New Mexico (fig. 898). STIPA SPARTEA var. CURTISÉTA Hitchc. Glumes 2 to 3 cm long; lemma 12 to 15 mm long; awn mostly not more than 7 or 8 cm long. 2l —Manitoba to Alberta, Montana, South Dakota, and Wyoming.

10. Stipa comáta Trin. and Rupr. NEEDLE-AND-THREAD. (Fig. 899.) Culms 30 to 60 cm tall, sometimes taller; ligule thin, 3 to 4 mm long; blades 10 to 30 cm long, 1 to 2 mm wide, flat or involute, panicle commonly included at base, narrow, 10 to 20 cm long; glumes 1.5 to 2 cm long, the attenuate tips subhyaline; lemma 8 to 12 mm long, mostly about 1 cm, pale or finally brownish, the callus about 3 mm long, the body sparsely pubescent or glabrate toward the summit; awn 10 to 15 cm long, indistinctly twice-geniculate, very slender, loosely twisted below, flexuous above, often deciduous. 2l —Prairies, plains, and dry hills, Indiana to Yukon Territory, south to Texas and California (fig. 900.) A form from Washington with pubescent foliage has been called *S. comota* var. *intonsa* Piper. STIPA COMATA var. INTERMEDIA Scribn. and Tweedy. Differing from *S. comata* in the shorter straight third segment of the awn; glumes and lemma on the average a little longer; panicle usually exserted; ligule long, as in *S. comata*.—Montana to Washington, south to New Mexico and California.

FIGURE 900.—Distribution of *Stipa comata*.

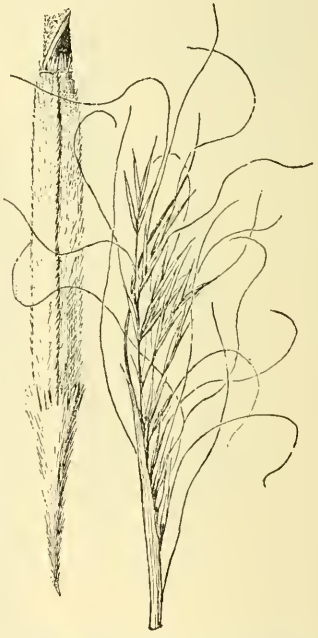

FIGURE 899.—*Stipa comata*. Panicle, × ½; lemma, × 5. (Hitchcock 1700, Colo.)

11. Stipa púlchra Hitchc. PURPLE NEEDLEGRASS. (Fig. 901.) Culms 60 to 100 cm tall; blades long, narrow, flat or involute; ligule about 1 mm long; panicle nodding, about 15 cm long, loose, the branches spreading, slender, some of the lower 2.5 to 5 cm long; glumes narrow, long-acuminate, purplish, 3-nerved, the first about 2 cm long, the second 2 to 4 mm shorter; lemma 8 to 10 mm long, fusiform, sparingly pilose, sometimes only in lines above, minutely papillose-roughened, the callus about 2 mm long, the summit sometimes with a smooth neck and a ciliate crown (as in *S. leucotricha*); awn 4 to 6 cm long, short-pubescent to the second bend, the first segment 1.5 to 2 cm long, the second shorter, the third slender, flexuous. 2↓ —Open ground, central California to Baja California, mostly in the Coast Ranges.

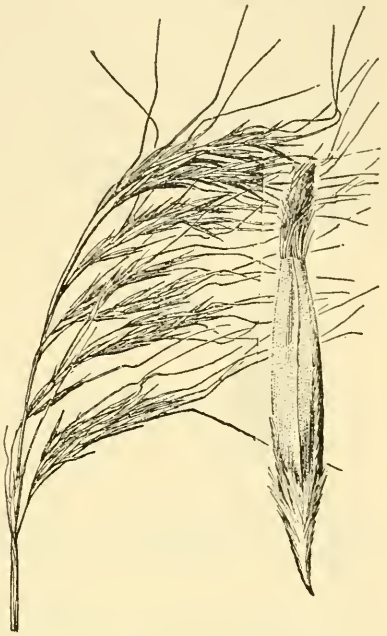

FIGURE 901.—*Stipa pulchra*. Panicle, ×½; lemma, × 5. (Chase 5598, Calif.)

12. Stipa príngleí Scribn. PRINGLE NEEDLEGRASS. (Fig. 902.) Culms, about 1 m tall; ligule about 2 mm long; blades 10 to 30 cm long, 1 to 3 mm wide, flat or those of the innovations involute, firm, erect, scabrous, panicle nodding, 10 to 15 cm long, the branches ascending, few-flowered, naked below; glumes about 1 cm long, broad, rather abruptly narrowed into a short point, 7- to 9-nerved; lemma 7 to 8 mm long, oblong-elliptic, brown, minutely papillose and brownish pubescent, the callus 1 mm long; awn about 3 cm long, obscurely twice-geniculate. 2↓ —Rocky woods and slopes, Texas, New Mexico, and Arizona to Chihuahua, Mex.

FIGURE 902.—*Stipa pringlei*. Floret, × 1; lemma, × 5. (Hitchcock 7691, Mex.)

13. Stipa éminens Cav. (Fig. 903.) Culms slender, rather wiry, 80 to 120 cm tall; ligule 3 to 6 mm long; blades mostly elongate, flat or involute, 1 to 4 mm wide; panicle nodding, open, 10 to 20 cm long, usually densely pilose on the lower node, the branches slender, spreading, often flexuous, usually 3 to 4 or even more at the node; glumes about 1.5 cm long; lemma pale, 5 to 7 mm long, pubescent; awn 3 to 6 cm long, obscurely twice-geniculate, the third segment flexuous. 2↓ —Rocky hills, Texas to Arizona and central Mexico.

FIGURE 903.—*Stipa eminens*. Floret, × 1; lemma, × 5. (Palmer 523, Mex.)

14. Stipa lépida Hitchc. FOOTHILL NEEDLEGRASS. (Fig. 904.) Culms slender, puberulent below the nodes, 60 to 100 cm tall; sheaths smooth, rarely puberulent, sparingly villous at throat; ligule very short; blades 10 to 30 cm long, flat, 2 to 4 mm wide, pubescent on upper surface near base; panicle rather loose and open, usually 15 to 20 cm long, sometimes more than 30 cm long, the branches distant, slender; glumes 3-nerved, smooth, acuminate, the first 6 to 10 mm long, the second about 2 mm shorter; lemma about 6 mm long, brown, sparingly villous, nearly glabrous toward the hairy-tufted apex; awn indistinctly twice-geniculate, about 2.5 to 4 cm long, scabrous. ♃ —Dry hills, open woods, and rocky slopes, central California to Baja California, in the Coast Range. STIPA LEPIDA var. ANDERSÓNI (Vasey) Hitchc. Differing only in the more slender culms, the slender involute blades, and in the narrow or reduced panicle.—Same range as the species.

FIGURE 904.—*Stipa lepida*. Floret, × 1; lemma, × 5. (Chase 5609, Calif.)

FIGURE 905.—*Stipa porteri*. Floret, × 1; lemma, × 5. (Wolf 1109. Colo.)

FIGURE 906.—*Stipa thurberiana* Floret, × 1; lemma, × 5. (Chase 4689, Idaho.)

15. Stipa portéri Rydb. (Fig. 905.) Culms 20 to 35 cm tall; ligule 2 to 3 mm long; blades 2 to 12 cm long, involute, subfiliform, sulcate, scaberulous; panicle mostly 5 to 10 cm long, open, the branches distant, capillary, flexuous, few-flowered; glumes 5 to 6 mm long; lemma about 5 mm long, oblong-elliptic, softly pilose on the lower half, scaberulous above, lobed at summit; awn 12 to 15 mm long, plumose with hairs 1 to 2 mm long, with a single bend one-third from the base, the first segment weakly twisted. ♃ —High mountains of Colorado.

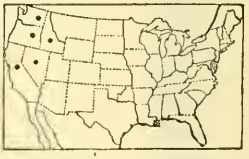

FIGURE 907.—Distribution of *Stipa thurberiana*.

16. Stipa thurberiána Piper. THURBER NEEDLEGRASS. (Fig. 906.) Culms mostly 30 to 60 cm tall; sheaths scaberulous or the upper glabrous; ligule hyaline, 3 to 6 mm long; blades 10 to 25 cm long, filiform, involute, scabrous, flexuous; panicle mostly 8 to 15 cm long, narrow, the ascending branches few flowered; glumes 11 to 13 mm long, the acuminate summit hyaline; lemma 8 to 9 mm long, appressed-pubescent, callus about 1 mm long; awn 4 to 5 cm long, twice-geniculate, the first and second segments plumose with hairs 1 to 2 mm long. ♃ —Mesas and rocky slopes. Idaho to Washington and central California (fig. 907).

17. Stipa elméri Piper and Brodie. (Fig. 908.) Culms 60 to 100 cm tall, more or less puberulent, especially at the nodes; sheaths pubescent; ligule very short; blades 15 to 30 cm long, 2 to 4 mm wide, flat or becoming involute, pubescent on the upper surface, or those of the innovations also on the lower surface; panicle narrow, 15 to 35 cm long, rather loose; glumes 12 to 14 mm long, long-acuminate, hyaline except toward base; lemma about 7 mm long, appressed-pubescent, the callus 1 mm long; awn 4 to 5 cm long, distinctly twice-geniculate, the segments nearly equal, the first and second finely plumose. ♃ —Dry hills, sandy plains, and open woods, Washington and Idaho to California and Nevada (fig. 909).

FIGURE 908.—*Stipa elmeri*. Floret, × 1; lemma, × 5. (Hitchcock 3336, Calif.)

FIGURE 909.—Distribution of *Stipa elmeri*.

18. Stipa latiglúmis Swallen. (Fig. 910.) Culms slender, erect, strigose below, 50 to 110 cm tall; sheaths, at least the lower, pubescent; blades flat or loosely involute, pilose on the upper surface, glabrous beneath; ligule 1 to 4 mm long; panicle narrow, loosely flowered, 15 to 30 cm long, the branches distant, slender, the lower as much as 10 cm long; glumes about equal, firm, rather abruptly acute or acuminate, 3-nerved, tinged with purple, 13 to 15 mm long, 1.5 mm wide from keel to margin; lemma densely pubescent, 8 to 9 mm long, the sharp callus 1 mm long; awn twice-geniculate, 3.5 to 4.5 cm long, the first and second segments plumose. ♃ —Sierras of central California at medium altitudes.

FIGURE 910—*Stipa latiglumis*. Floret, × 1; lemma, × 5. (Type.)

19. Stipa occidentális Thurb. WESTERN NEEDLEGRASS. (Fig. 911.) Culms mostly 25 to 40 cm tall; sheaths glabrous; ligule about 0.5 mm long; blades 10 to 20 cm long, 1 to 2 mm wide, flat or usually involute, glabrous beneath; panicle 10 to 20 cm long, lax, the few slender branches narrowly ascending; glumes about 12 mm long, the attenuate tips hyaline; lemma pale brown, about 7 mm long, rather sparsely appressed-pubescent; awn 3 to 4 cm long, twice-geniculate, the first and second segments plumose, the hairs about 1 mm long. ♃ —Plains, rocky hills, and open woods, Wyoming to Washington and California (fig. 912).

FIGURE 912.—Distribution of *Stipa occidentalis*.

FIGURE 911.—*Stipa occidentalis*. Panicle, × ½; lemma, × 5. (Hitchcock 11740, Oreg.)

20. Stipa lobáta Swallen. (Fig. 913.) Culms densely tufted, erect, scaberulous below the panicle, 35 to 85 cm tall; blades flat or loosely folded toward the base, tapering into a fine point, as much as 50 cm long, 1 to 4 mm wide at the base, scabrous on the upper surface, glabrous beneath; ligule less than 0.5 mm long; panicle narrow, 10 to 18 cm long, the branches appressed; glumes about equal, acuminate, 3-nerved, scabrous, 9 to 10 mm long; lemma brownish, 6 mm long, densely pubescent with hairs 1 to 2 mm long, the callus very short, blunt, the summit 2-lobed, the lobes 0.8 to 1.5 mm long, awned from between the lobes; awn twice-geniculate, 12 to 16 mm long, the first and second segments appressed-hispid. 2l —Rocky hills at medium altitudes, western Texas and New Mexico.

FIGURE 913.—*Stipa lobata*. Floret, × 1; lemma, × 5; summit of lemma, × 15. (Type.)

FIGURE 914.—*Stipa californica*. Floret, × 1; lemma, × 5. (Hall 2556, Calif.)

21. Stipa californica Merr. and Davy. (Fig. 914.) Culms 75 to 125 cm tall; ligule rather firm, 1 to 2 mm long; blades 10 to 12 cm long, 1 to 4 mm wide, flat, becoming involute, those of the innovations slender and involute; panicle 15 to 30 cm, sometimes to 50 cm, long, slender, pale; glumes about 12 mm long; lemma 6 to 8 mm long, rather sparsely villous with ascending white hairs, those at the summit about 1.5 mm long; awn 2.5 to 3.5 cm long, twice-geniculate, the first and second segments plumose. 2l —Dry open ground, Washington to California and western Nevada (fig. 915).

FIGURE 915.—Distribution of *Stipa californica*.

22. Stipa curvifólia Swallen. (Fig. 916, *A*.) Culms densely tufted, erect, about 35 cm tall; leaves clustered toward the base, the lowermost sheaths pubescent, the blades involute, becoming curved with age; panicle 7 to 8 cm long, dense, the branches short, appressed; glumes about 10 mm long; lemma 5.5 mm long, light brown, evenly white pilose; awn once or obscurely twice-geniculate, 22 to 25 mm long, twisted and densely plumose below the bend. 2l —Known only from limestone cliffs, Guadelupe Mountains, N.Mex.

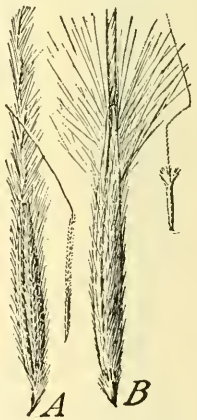

FIGURE 916.—*A*, *Stipa curvifolia*. Floret, × 1; lemma, × 5. (Type.) *B*, *S. scribneri*. Floret, × 1; lemma, × 5. (Vasey, N.Mex.)

23. Stipa scribnéri Vasey. SCRIBNER NEEDLEGRASS. (Fig. 916, *B*.) Culms 30 to 70 cm tall; sheaths villous at the throat; ligule less than 1 mm long; blades 15 to 25 cm long, 2 to 4 mm wide, flat or sometimes involute; panicle 10 to 25 cm long, contracted, the rather short stiff branches erect; glumes 10 to 15 mm long, relatively firm, attenuate; lemma about 8 mm long, pale,

narrow-fusiform, villous with white hairs, those at the summit about 2 mm long, forming a brushlike tip; awn 14 to 20 mm long, twice-geniculate. ♃ —Mesas and rocky slopes, Colorado, Utah, New Mexico, and Arizona (fig. 917).

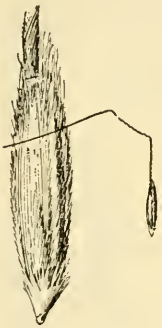

FIGURE 918.—*Stipa lemmoni.* Floret, × 1; lemma, × 5. (Butler 830, Calif.)

24. Stipa lemmóni (Vasey) Scribn. LEMMON NEEDLEGRASS. (Fig. 918.) Culms 30 to 80 cm tall, scaberulous, usually puberulent below the nodes; ligule 1 to 3 mm long; blades 10 to 20 cm long, flat or involute, 1 to 2 mm wide, or those of the innovations very narrow; panicle 5 to 12 cm long, narrow, pale or purplish; glumes 8 to 10 mm long, rather broad and firm, somewhat abruptly acuminate, the first 5-nerved, the second 3-nerved; lemma 6 to 7 mm long, pale or light brown, the callus rather blunt, the body fusiform, 1.2 mm wide, villous with appressed hairs; awn 20 to 35 mm long, twice-geniculate, appressed-pubescent to the second bend. ♃ —Dry open ground and open woods, British Columbia to Idaho and California (fig. 919).

FIGURE 917.—Distribution of *Stipa scribneri.*

FIGURE 919.—Distribution of *Stipa lemmoni.*

25. Stipa virídula Trin. GREEN NEEDLEGRASS. (Fig. 920.) Culms 60 to 100 cm tall; sheaths villous at the throat, often rather sparingly so, more or less hispidulous in a line across the collar; ligule about 1 mm long; blades 10 to 30 cm long, 1 to 3 or even 5 mm wide, flat or, especially on the innovations, involute; panicle 10 to 20 cm long, narrow, rather closely flowered, greenish or tawny at maturity; glumes 7 to 10 mm long, hyaline-attenuate; lemma 5 to 6 mm long, fusiform, at maturity plump, more than 1 mm wide, the body at maturity brownish, appressed-pubescent, the callus rather blunt; awn 2 to 3 cm long, twice-geniculate. ♃ —Plains and dry slopes, New York (Cobbs Hill, Rochester), Wisconsin to Alberta, south to Kansas and New Mexico (fig. 921).

FIGURE 920.—*Stipa viridula.* Floret, × 1; lemma and summit of sheath, × 5. (Griffiths 201, S.Dak.)

FIGURE 921.—Distribution of *Stipa viridula.*

26. Stipa robústa Scribn. SLEEPY GRASS. (Fig. 922.) Culms robust, mostly 1 to 1.5 m tall; sheaths villous at the throat and on the margin, a strong hispidulous line across the collar; ligule 2 to 4 mm long; blades elongate, flat or on the innovations involute, those of the culm as much as 8 mm wide; panicle narrow, compact, often more or less interrupted below, as much as 30 cm long and 2 cm thick; glumes about 1 cm long, attenuate into a fine soft point;

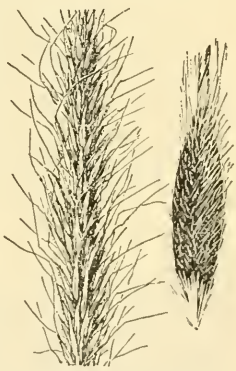

FIGURE 922.—*Stipa robusta.* Panicle, × ½; lemma, × 5. (Hitchcock 13280, N.Mex.)

lemma 6 to 8 mm long, about as in *S. viridula;* awn 2 to 3 cm long, rather obscurely twice-geniculate. 2↓ (*S. vaseyi* Scribn.)—Dry plains and hills and dry open woods, Colorado to northern Mexico (fig. 923). Said to act as a narcotic on animals that graze upon it, especially affecting horses.[8]

27. Stipa columbiána Macoun. COLUMBIA NEEDLEGRASS. (Fig. 924.) Culms mostly 30 to 60 cm tall, sometimes as much as 1 m; sheaths naked at the throat; ligule 1 to 2 mm long; blades 10 to 25 cm long, 1 to 3 mm wide, mostly involute, especially on the innovations, those of the culm sometimes flat; panicle 5 to 15 cm long, narrow, mostly rather dense, often purplish; glumes about 1 cm long; lemma 6 to 7 mm long, pubescent as in *S. viridula,* the body narrower, the callus sharper; awn 2 to 2.5 cm long, twice-geniculate. 2↓ (*S. minor* Scribn.)—Dry plains, meadows, and open woods, at medium and high altitudes, Wyoming to Yukon Territory, south to Texas and California (fig. 925). Differing from *S. viridula* in the glabrous throat of the sheath and in the shape of the fruit.

FIGURE 923.—Distribution of *Stipa robusta.*

FIGURE 924.—*Stipa columbiana.* Panicle, × ½; lemma, × 5. (Nelson 7478, Wyo.)

STIPA COLUMBIANA var. NELSÓNI (Scribn.) Hitchc. Differing in its usually larger size, often as much as 1 m tall, the broader culm blades, and the larger and denser panicle; lemma 6 to 7 mm long; awn as much as 3.5 cm long, sometimes longer. 2↓ —Alberta to Washington, south to Colorado and Baja California.

28. Stipa lettermáni Vasey. LETTERMAN NEEDLEGRASS. (Fig. 926.) Resembling small forms of *S. columbiana;* culms often in large tufts, 30 to 60 cm tall; blades slender, involute; panicle slender, narrow,

FIGURE 925.—Distribution of *Stipa columbiana.*

FIGURE 926.—*Stipa lettermani.* Floret, × 1; lemma, × 5. (Letterman 102, Idaho.)

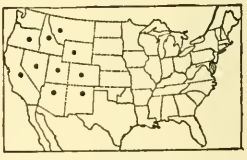

FIGURE 927.—Distribution of *Stipa lettermani.*

loose, 10 to 15 cm long; glumes about 6 mm long; lemma 4 to 5 mm long, slender and more copiously hairy than in *S. columbiana;* awn 1.5 to 2 cm long. 2↓ —Open ground or open woods at upper altitudes, Wyoming to Montana and Oregon, south to New Mexico and California (fig. 927).

[8] Contr. U.S. Nat. Herb. 24: 252. 1925.

29. Stipa williámsii Scribn. WILLIAMS NEEDLEGRASS. (Fig. 928.) Differing from *S. columbiana* chiefly in having more or less pubescent culms, sheaths, and blades; culms 60 to 100 cm tall; panicle 10 to 20 cm long; lemma about 7 mm long; awn usually 3 to 5 cm long. 2l — Dry hills and plains, Montana to Washington, south to Colorado and California (fig. 929).

30. Stipa pinetórum Jones. (Fig. 930.) Culms in large tufts, 30 to 50 cm tall; ligule very short; leaves mostly basal, the blades 5 to 12 cm long, involute-filiform, more or less flexuous, slightly scabrous; panicle narrow, 8 to 10 cm long; glumes about 9 mm long; lemma 5

FIGURE 928.—*Stipa williamsii*. Floret, × 1; lemma, × 5. (Williams 2804, Wyo.)

FIGURE 929.—Distribution of *Stipa williamsii*

FIGURE 930.—*Stipa pinetorum*. Floret, × 1; lemma, × 5. (Jones 6023, Colo.)

mm long, narrowly fusiform, clothed especially on the upper half with hairs 2 mm long, forming a conspicuous tuft exceeding the body of the lemma; awn about 2 cm long, twice-geniculate, nearly glabrous. 2l—Open pine woods at high altitudes, rare, Colorado, Utah, Nevada, and California (fig. 931).

31. Stipa árida Jones. (Fig. 932.) Culms 40 to 80 cm tall; blades 10 to 20 cm long, 1 to 2 mm wide, flat or involute, scabrous; panicle 10 to 15 cm long, narrow, compact, pale or silvery; glumes 8 to 12 mm long; lemma about 5 mm long, appressed-pubescent on the lower half and along the margin, slightly roughened toward the summit; awn 4 to 6 cm long, capillary, scaberulous, loosely twisted for 1 or 2 cm, flexuous beyond. 2l —Rocky slopes, rare, southwestern Colorado, Utah, and Arizona.

FIGURE 931.—Distribution of *Stipa pinetorum*.

FIGURE 932.—*Stipa arida*. Floret, × 1; lemma, × 5. (Jones 5377, Utah.)

32. Stipa tenuíssima Trin. (Fig. 933.) Culms in large tufts, slender, wiry, 30 to 70 cm tall; ligule 2 mm long; blades 15 to 30 cm long, sometimes longer, filiform, wiry, closely involute; panicle 10 to 30 cm long, narrow, soft, nodding; glumes about 1 cm long; lemma 2 to 3 mm long, oblong-elliptic, glabrous, minutely papillose-roughened, the short callus densely pilose; awn about 5 cm long, capillary, flexuous, obscurely geniculate about the middle. 2l —Dry open ground, rocky slopes, and open dry woods, Texas and New Mexico to central Mexico; Argentina.

FIGURE 933.—*Stipa tenuissima*. Plant, × ½; spikelet, × 2; glumes and floret, × 5. (Bailey 694, **Tex.**)

Stipa neesiána Trin. and Rupr. Related to *S. leucotricha* but with shorter lemma with thickened erose crown. ♃ —Ballast, Mobile. Ala.; South America.

Stipa brachychaéta Godr. Blades firm, flat, or loosely involute; panicle narrow, open, the few spikelets on slender pedicels; glumes 8 mm long; lemma 5 mm long, brown, pubescent in lines; awn 12 mm long. ♃ —Ballast near Portland, Oreg.; Argentina.

STIPA ELEGANTÍSSIMA Labill. Tufted perennial; foliage scant; panicle commonly half the height of the plant, the filiform spreading branches conspicuously feathery; spikelets purple, long-awned. ♃ —Sometimes cultivated for ornament; Australia.

STIPA PENNÁTA L. Tufted perennial; blades elongate, involute; panicle few-flowered, the large spikelets with awns 25 to 35 cm long, conspicuously feathery above the bend. ♃ —Sometimes cultivated for ornament; Europe.

STIPA TENACÍSSIMA L. ESPARTO. Tufted perennial with tough branching base; blades elongate, involute, tomentose at base and with erect auricles 3 to 10 mm long; panicle narrow, dense; awns 4 to 6 cm long, feathery below the bend. ♃ —Sometimes cultivated for ornament; Spain and Algeria, where it is gathered for making paper and cordage.

85. ARISTIDA L. THREE-AWN

Spikelets 1-flowered, the rachilla disarticulating obliquely above the glumes; glumes equal or unequal, narrow, acute, acuminate, or awn-tipped; lemma indurate, narrow, terete, convolute, with a hard, sharp-pointed, usually minutely bearded callus, terminating above in a usually trifid awn (the lateral divisions reduced or obsolete in Section Uniseta), the base sometimes undivided, forming a column. Annual or perennial, mostly slender tufted grasses, with narrow, frequently convolute blades and narrow or sometimes open panicles. Type species, *Aristida adscensionis* L. Name from Latin *arista*, awn.

The species are of distinctly minor importance for forage except in the Southwest, where several, such as *A. longiseta*, are eaten by stock before the flowers are produced. The ripe fruits of several species are troublesome to stock on the plains because of the sharp hard points. These fruits are produced sometimes in vast numbers and are carried far and wide by the wind in open country. *Aristida adscensionis* is one of the annuals that make up the "six-weeks" grasses of the Southwest.

Lemma articulate with the column of the awns; awns nearly equal. SECTION 1. ARTHRATHERUM.

Lemma not articulate.
- Lateral awns minute (less than 1 mm long) or wanting. SECTION 2. UNISETA.
- Lateral awns more than 1 mm long (rarely obsolete in *A. ramosissima*), usually well developed. SECTION 3. CHAETARIA.

Section 1. Arthratherum

Plants annual.
- Column very short. 1. A. DESMANTHA.
- Column 10 to 15 mm long, twisted. 2. A. TUBERCULOSA.

Plants perennial.
- Culms pubescent. 3. A. CALIFORNICA
- Culms glabrous. 4. A. GLABRATA

Section 2. Uniseta

Awn (column) tiwsted at base. 7. A. ORCUTTIANA

Awn not twisted.
- Branches of panicle distant, spreading, mostly more than 5 cm long, naked at base; awn straight or abruptly divergent. 5. A. TERNIPES.
- Branches of panicle short, approximate, 3 to 5 cm long, floriferous nearly to base; awn curved and flexuous. 6. A. FLORIDANA

Section 3. Chaetaria

1a. Central awn spirally coiled at the base, the lateral straight. Plants annual. (Group DICHOTOMAE.)
Lateral awns half to two-thirds as long as the central, somewhat spreading. 8. A. BASIRAMEA.
Lateral awns much shorter than the central, 1 to 3 mm long, erect.
Glumes nearly equal, 6 to 8 mm long; lemma sparsely appressed-pilose, 5 to 6 mm long---------- 9. A. DICHOTOMA.
Glumes unequal, the second longer, about 1 cm long; lemma glabrous except the keel, scabrous toward the apex, about 1 cm long- 10. A. CURTISSII.
1b. Central awn not spirally coiled (in a few species all the awns loosely contorted in the lower part).
2a. Plants annual. (Group ADSCENSIONES.)
Awns mostly 4 to 7 cm long, about equal, divergent-- 11. A. OLIGANTHA.
Awns mostly less than 2 cm long, often unequal.
Central awn with a semicircular bend at base, spreading or reflexed.
Lateral awns much reduced; lemma about 2 cm long. 12. A. RAMOSISSIMA.
Lateral awns one-third to half as long as the central; lemma 4 to 5 mm long---------- 13. A. LONGESPICA.
Central awn not sharply curved, the awns about equally divergent.
Glumes unequal; awns flat at base, 10 to 15 mm long. 14. A. ADSCENSIONIS.
Glumes about equal; awns terete, 15 to 20 mm long. 15. A. INTERMEDIA.
2b. Plants perennial.
3a. Panicle open, the branches spreading (in *A. pansa* ascending), naked at base. (Group DIVARICATAE.)
Panicle branches stiffly and abruptly spreading or reflexed at base.
Branchlets divaricate and implicate---------- 16. A. BARBATA.
Branchlets appressed.
Summit of lemma narrowed into a twisted neck 2 to 5 mm long. 17. A. DIVARICATA.
Summit of lemma somewhat narrowed but not twisted. 18. A. HAMULOSA.
Panicle branches drooping or ascending, not abruptly spreading at base.
Lateral awns one-fourth to half as long as the central one. 19. A. PATULA.
Lateral awns about as long as the central, at least more than half as long---------- 20. A. PANSA.
b. Panicle narrow, the branches ascending or appressed (branches sometimes somewhat spreading in *A. parishii* and *A. purpurea*).
Column 1 cm or more long, twisted; glumes awned- 21. A. SPICIFORMIS.
Column less than 1 cm long.
Creeping rhizomes present. Glumes unequal, awned; awns loosely twisted at base, the central a little longer, 18 to 24 mm long. 31. A. RHIZOMOPHORA.
Creeping rhizomes wanting (sometimes short ones in *A. stricta*).
4a. First glume about half as long as the second (as much as two-thirds as long in *A. glauca*). (Group PURPUREAE.)
Lemma tapering into a slender somewhat twisted beak 5 to 6 mm long; awns 1.5 to 2.5 cm long, widely spreading. 22. A. GLAUCA.
Lemma beakless or only short-beaked.
Branches of the rather loose and nodding panicle slender and flexuous (see also *A. longiseta* var. *rariflora*).
Lemma about 1 cm long; awns 3 to 5 cm long. 23. A. PURPUREA.
Lemma 7 to 8 mm long; awns about 2 cm long. 24. A. ROEMERIANA.
Branches of the erect panicle stiff and appressed, or the lowermost sometimes somewhat flexuous.
Panicle mostly more than 15 cm long, the branches several-flowered; awns about 2 cm long. Sheaths with a villous line across the collar---------- 25. A. WRIGHTII.
Panicle mostly less than 15 cm long, the branches few flowered; awns 2 to several cm long.

Lemma gradually narrowed above, scaberulous on the upper half; leaves mostly in a short curly cluster at the base of the plant---------- 27. A. FENDLERIANA.
Lemma scarcely narrowed above, scaberulous only at the tip; leaves not conspicuously basal. 26. A. LONGISETA.
4b. First glume more than half as long as the second. (Usually the glumes about equal or the first sometimes a little longer.)
Sheaths lanate-pubescent. Panicle branched, somewhat spreading; central awn 1.5 to 2.5 cm long, spreading or reflexed from a curved base---------- 28. A. LANOSA.
Sheaths not lanate-pubescent.
Column of awn at maturity 3 to 5 mm long, distinctly twisted. 29. A. ARIZONICA.
Column of awn less than 3 mm long, or if so long, not twisted.
Blades villous on upper surface near base, involute. 30. A. STRICTA.
Blades not involute and villous at base.
Awns at maturity about equally divergent, sometimes slightly twisted but not spirally contorted at base.
Lemma about 7 mm long; awns horizontally spreading; panicle usually more than 20 cm long. 32. A. PURPURASCENS.
Lemma 10 to 12 mm long; awns somewhat spreading but scarcely horizontal; panicle mostly 10 to 15 cm long. 33. A. PARISHII.
Awns at maturity unequally divergent or spirally contorted at base.
Awns not spirally contorted at base; central awn more spreading than the others, curved at base, sometimes reflexed.
Lateral awns erect, two-thirds to three-fourths as long as the central.
Glumes about 12 mm long---------- 34. A. AFFINIS.
Glumes about 6 mm long---------- 35. A. VIRGATA.
Lateral awns spreading or reflexed. Panicles nearly simple.
Glumes 6 to 7 mm long; spikelets mostly in pairs. 36. A. SIMPLICIFLORA.
Glumes about 1 cm long; spikelets solitary. 37. A. MOHRII.
Awns spirally contorted at base, spreading.
Blades flat.
Panicle slender, the branches short, rather distant, few-flowered---------- 38. A. TENUISPICA.
Panicle rather thick, the branches as much as 10 cm long, rather densely many-flowered. 39. A. CONDENSATA.
Blades involute---------- 40. A. GYRANS.

SECTION 1. ARTHRÁTHERUM (Beauv.) Reichenb.

Lemma articulate with the column of the awns, the latter finally deciduous; glumes 1-nerved; awns nearly equal.

1. Aristida desmántha Trin. and Rupr. (Fig. 934.) Annual; branching, as much as 80 cm tall; sheaths often woolly; blades folded or involute, 2 to 3 mm wide; panicle as much as 20 cm long, the branches stiffly ascending, very scabrous, bearing 1 to few spikelets; glumes slightly unequal, the body about 1 cm long, tapering into an awn about half as long; lemma 7 to 8 mm long, glabrous below, somewhat laterally compressed and slightly twisted at summit, the densely pubescent callus about 2 mm long; awns 2 to 2.5 cm long, united for 1 to 2 mm, the bases curved in a semicircular somewhat contorted bend, the upper part thus usually deflexed. ⊙ —Open sandy soil or sandy woods, Illinois, Nebraska, and Texas.

2. Aristida tuberculósa Nutt. (Fig. 935.) Annual; culms branching, 30 to 60 cm or even 1 m tall; blades involute, 2 to 4 mm wide when flat; panicle 10 to 20 cm tall, the branches stiffly ascending; glumes about equal, gradually narrowed into an awn, about 2.5 cm long, including the awn; lemma 11 to 13 mm long, glabrous, except for the slightly scabrous summit, extending downward into a densely pubescent callus 3 to 4 mm long; column of awns twisted, 10 to 15 mm long, the upper 2 or 3 mm twisted but not united, above this forming a semicircular bend, the terminal straight part of the awns usually deflexed, 3 to 4 cm long. ⊙ —Open sandy woods, Massachusetts to Georgia and Mississippi near the coast; around the southern

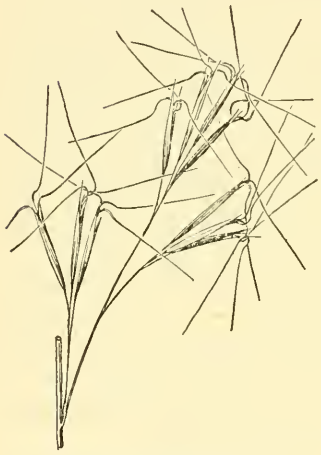

FIGURE 934.—*Aristida desmantha*, × 1. (Reverchon 3428, Tex.)

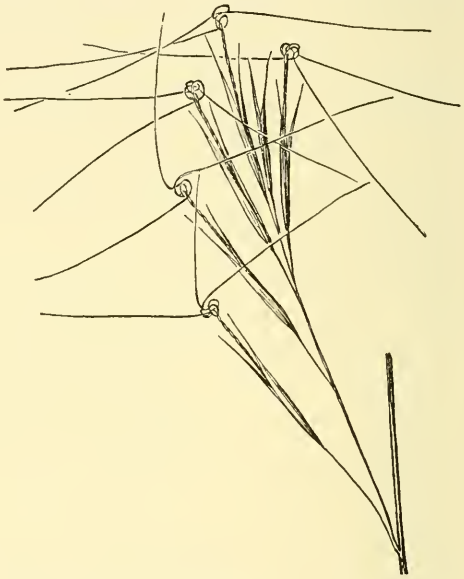

FIGURE 935.—*Aristida tuberculosa*, × 1. (V. H. Chase 322, Ind.)

end of Lake Michigan and in other localities in Wisconsin, Indiana, Illinois, Iowa, and Minnesota (fig. 936).

3. Aristida califórnica Thurb. (Fig. 937.) Perennial, tufted, much branched at base; culms pubescent, 10 to 30 cm tall; blades mostly involute and less than 5 cm long; panicles numerous, mostly reduced to few-flowered racemes; first glume about 8 mm long, the second about 12 mm long; lemma 5 to 7 mm long, glabrous below, scaberulous toward the summit, the strongly pubescent callus 1.5 to 2 mm long; column 15 to 20 mm long, the awns about equal, 2.5 to 3.5 cm long, spreading horizontally, the bases arcuate and slightly contorted. ♃ —Dry sandy or gravelly soil, deserts of southern California, southwestern Arizona, and northern Mexico.

FIGURE 936.—Distribution of *Aristida tuberculosa*.

4. Aristida glabráta (Vasey) Hitchc. (Fig. 938.) Perennial; culms erect, branched, glabrous, 20 to 40 cm tall; blades mostly involute, those of the culm 1 to 3 cm long; panicle narrow, 3 to 6 cm long; first glume 5 to 6 mm, the second 10 to 12 mm long; lemma 5 to 7 mm long,

the twisted column 6 to 14 mm long; awns about equal, divergent, 2 to 3 cm long. 2ł —Open dry ground, southern Arizona to Baja California.

SECTION 2. UNISÉTA Hitchc.

Lateral awns minute (less than 1 mm long) or wanting, (see also *A. dichotoma* and *A. ramosissima* of Section Chaetaria); lemma not articulate with the column of the awn.

5. Aristida térnipes Cav. SPIDER GRASS. (Fig. 939.) Perennial; culms erect, 50 to 100 cm tall; blades flat, involute toward the end

FIGURE 937.—*Aristida californica*, × 1.
(Kearney 3524, Ariz.)

FIGURE 938.—*Aristida glabrata*, × 1.
(Griffiths 7312, Ariz.)

and tapering into a fine point as much as 40 cm long, 2 to 3 mm wide; panicle open, one third to half the entire height of the culm, the branches few, distant, spreading, scabrous, mostly naked at the base; spikelets appressed at the ends of the branches; glumes about equal, 8 to 10 mm long; lemma glabrous, often strongly scabrous on the keel, gradually narrowed into a laterally compressed scabrous falcate beak,

1-nerved on each side, this extending into a single straight or divergent scabrous nearly terete awn, the obsolete or minute lateral awns about 17 mm above the lemma, the central awn 10 to 15 mm long. ♃ (*A. scabra* Kunth.)—Rocky hills and dry plateaus, New Mexico and Arizona to northern South America; Bahamas, Cuba.

FIGURE 939.—*Aristida ternipes*, × 1. (Griffiths 7271, Ariz.)

ARISTIDA TERNIPES var. MÍNOR (Vasey) Hitchc. Smaller and often prostrate or ascending, the panicle usually more than half the length of the entire plant, less diffuse, the shorter branches usually stiffly spreading or somewhat deflexed. ♃ (*A. divergens* Vasey.)—Rocky hills and plains, Texas, New Mexico, Arizona; Nicaragua.

6. Aristida floridána (Chapm.) Vasey. (Fig. 940.) Resembling *A. ternipes*, but differing in having a narrow panicle with ascending branches 3 to 5 cm long, spikelet-bearing nearly to the base; awns sickle-shaped, the column somewhat twisted. ♃ —Known only from the original collection from Key West, Fla.

7. Aristida orcuttiána Vasey. BEGGARTICK GRASS. (Fig. 941.) Perennial; culms erect, 30 to 60 cm or even 1 m tall; blades flat or the upper involute, as much as 3 mm wide; panicle open, as much as 30

FIGURE 940.—*Aristida floridana*, × 1. (Blodgett, Fla.)

FIGURE 941.—*Aristida orcuttiana*. Panicle, × 1; floret, × 2. (Smith, N.Mex.)

cm long, nodding or drooping, the branches few, distant, spreading or drooping, as much as 20 cm long; glumes equal or nearly so, 10 to 15 mm long; lemma 8 to 10 mm long, gradually narrowed into a

scabrous twisted column, the total length to the bend 10 to 17 mm; central awn divergent, 5 to 10 mm long, the lateral awns from obsolete to as much as 1 mm long, erect. 2↓

FIGURE 942.—Distribution of *Aristida orcuttiana.*

—Rocky hills and plains, Texas to southern California (San Diego), and northwest Mexico (fig. 942).

SECTION 3. CHAETÁRIA (Beauv.) Trin.

Lateral awns more than 1 mm long, usually well developed; lemma not articulate with the column of the awns.

FIGURE 943.—*Aristida basiramea,* × 1. (Pammel 174, Iowa.)

8. Aristida basirámea Engelm. (Fig. 943.) Annual; branching at base, 30 to 50 cm tall; blades flat, as much as 15 cm long and 1.5 mm wide; panicles terminal and axillary, the terminal 5 to 10 cm long, the axillary mostly enclosed in the sheaths; glumes somewhat unequal, 12 to 15 mm long; lemma about 1 cm long; central awn coiled at base, 10 to 15 mm long, the lateral awns half to two-thirds as long, somewhat spreading. ⊙ —Open barren or sandy soil, Michigan and North Dakota to Illinois and Kansas; introduced in Maine (fig. 944).

FIGURE 945.—*Aristida dichotoma,* × 1 (Jackson 1829, Del.)

9. Aristida dichótoma Michx. (Fig. 945.) Annual; culms branched at base,

FIGURE 944.—Distribution of *Aristida basiramea.*

20 to 40 cm tall; blades short, the lower mostly flat, scarcely 1 mm wide, the upper involute; panicles terminal and axillary, the terminal usually less than 10 cm long, the lateral small; glumes about equal, 6 to 8 mm long; lemma 5 to 6 mm long; central awn spirally coiled, horizontally bent, 3 to 6 mm long, the lateral awns erect, about 1 mm long. ⊙ —Dry open ground, Maine to eastern Kansas, south to Florida and Texas (fig. 946).

10. Aristida curtíssii (A. Gray) Nash. (Fig. 947.) Annual; similar to *A. dichotoma,* differing in the less branching habit, the longer

and more conspicuous blades, the looser panicles of larger spikelets, the more unequal glumes, the longer second glume (about 1 cm long), the longer smooth lemma (about 1 cm long) and central awn, and the usually longer lateral awns; central awn about 1 cm long, the lateral awns 2 to 4 mm long. ⊙ —Open dry ground, Maryland to West Virginia; Florida; Illinois to Wyoming and Oklahoma (fig. 948).

FIGURE 946.—Distribution of *Aristida dichotoma.*

11. Aristida oligántha Michx. PRAIRIE THREE-AWN. (Fig. 949.) Annual, much branched; culms 30 to 50 cm tall; blades flat or loosely involute, usually not more than 1 mm wide; panicle loose, 10 to 20 cm long; spikelets short-pediceled the lower often in pairs; glumes about equal, 2 to 3 cm long, tapering into an awn, the first 3- to 5-nerved; lemma about 2 cm long, the awns about equal, divergent, 4 to 7 cm long, somewhat spirally curved at base. ⊙ —Open dry ground, Massachusetts to South Dakota, south to Florida and Texas; Oregon to Arizona (fig. 950).

12. Aristida ramosíssima Engelm. (Fig. 951.) Annual, much branched; culms 30 to 50 cm tall; blades flat or involute, about 1 mm wide; panicle narrow, 8 to 12 cm long; glumes 3- to 5-nerved, the first about 15 mm, the second about 2 cm long, including an awn 3 to 5 mm long; lemma about 2 cm long, tapering into a neck about 5 mm long; central awn with a semicircular bend or part of a coil at base, 15 to 20 mm long, spreading, the lateral awns reduced or as much as 6 mm long, rarely longer. ⊙ —Open sterile soil, Indiana to Iowa, south to Tennessee, Louisiana, and Texas (fig. 952).

FIGURE 947.—*Aristida curtissii*, × 1. (Waite, Ill.)

13. Aristida longespíca Poir. (Fig. 953.) Annual, branched; culms 20 to 40 cm tall; blades flat or involute, about 1 mm wide; panicles narrow, slender, the terminal 10 to 15 cm or even 20 cm long; glumes about equal, 5 mm long; lemma 4 to 5 mm long; central awn sharply curved at base, spreading, 5 to 15 mm long, the lateral awns erect, one-third to half as long as the central, sometimes only 1 mm long. ⊙ (*A. gracilis* Ell.) —Sterile or sandy soil, New Hampshire to Michigan, south to Florida and Texas, especially on the Coastal Plain (fig. 954). In the typical form the lateral awns are short; in var. *geniculata* Fernald (*A. geniculata* Raf.) the lateral awns are more than one-third as long as the central one.

FIGURE 948.—Distribution of *Aristida curtissii.*

14. Aristida adscensiónis L. SIXWEEKS THREE-AWN. (Fig. 955.) Annual, branched at base, erect or spreading; culms 10 to 80 cm

FIGURE 949.—*Aristida oligantha*. Plant, × ½; glumes and floret, × 2. (Fitzpatrick 21, Iowa.)

tall; panicle narrow and usually rather compact, 5 to 10 cm long, or longer in large plants; first glume 5 to 7 mm long, the second 8 to 10 mm long; lemma 6 to 9 mm long, compressed toward the scarcely beaked summit, scabrous on the upper part of the keel; awns about equal (the lateral rarely shorter) mostly 10 to 15 mm long, about equally divergent at an angle of as much as 45 degrees, flat and without torsion at base. ⊙—Dry open ground, Missouri (Courtney); southern Kansas to Texas, west to Nevada and southern California, southward (fig. 956); warmer parts of the Old World. Originally described from Ascension Island. Variable in size from depauperate plants a few centimeters tall with shorter contracted panicle (*A. bromoides* H. B. K.) to tall slender plants with large open panicle (*A. fasciculata* Torr.).

FIGURE 950.—Distribution of *Aristida oligantha.*

FIGURE 951.—*Aristida ramosissima*, × 1. (Deam 18549, Ind.)

15. Aristida intermédia Scribn. and Ball. (Fig. 957.) Annual, simple or branched, 20 to 40 cm tall; blades flat or involute, mostly less than 10 cm long and 2 mm wide; panicle narrow, slender, loosely flowered, 10 to 20 cm long; glumes about equal, 1 cm long; lemma 8 mm long; awns about equal, all somewhat divergent, 1.5 to 2 cm long. ⊙ —Low sandy soil, Indiana to Nebraska, south to Mississippi and Texas (fig. 958). The measurements of the spikelet are sometimes less than those given, especially in plants attacked by smut.

FIGURE 953.—*Aristida longespica*, × 1 (Vasey, D.C.)

FIGURE 952.—Distribution of *Aristida ramosissima.*

FIGURE 954.—Distribution of *Aristida longespica.*

16. Aristida barbáta Fourn. HAVARD THREE-AWN. (Fig. 959.) Perennial, forming hemispherical tufts as much as 30 cm in diameter, the culms rather stiffly radiating in all directions, 15 to 30 cm long; blades closely involute, mostly less than 10 cm long and 0.5 mm thick; panicles about half the length of the entire culm, open, the branches divaricately spreading or somewhat reflexed, mostly 3 to 6 cm long, in pairs or with short basal branchlets, but without long naked base, the branchlets and pedicels implicate or flexuous, the whole panicle fragile at maturity, breaking away and rolling before the wind; glumes about equal, 1 cm long; lemma gradually narrowed into a straight or twisted scaberulous beak, the entire length 8 to 10 mm; awns somewhat divergent, nearly equal, 15 to 20 mm long. ♃ (*A. havardii* Vasey.)—Hills and plains, western Texas to Arizona and central Mexico.

FIGURE 955.—*Aristida adscensionis*, × 1. (Earle 559, N.Mex.)

FIGURE 956.—Distribution of *Aristida adscensionis*.

17. Aristida divaricáta Humb. and Bonpl. POVERTY THREE-AWN. (Fig. 960.) Perennial; culms erect or prostrate-spreading, usually 30 to 60 cm long, sometimes longer; blades flat or usually loosely involute, or the basal closely involute, mostly less than 3 mm wide; panicle large, diffuse, usually as much as half the entire length of the culm, the branches spreading or reflexed, naked below; glumes nearly equal, 1 cm long; lemma 1 cm long, narrowed into a twisted beak 2 to 5 mm long; awns about equal, 10 to 15 mm long. ♃ —Dry hills and plains, Kansas to southern California, south to Texas and Guatemala (fig. 961).

FIGURE 958.—Distribution of *Aristida intermedia*.

FIGURE 957.—*Aristida intermedia*, × 1. (Kearney 236, Miss.)

18. Aristida hamulósa Henr. (Fig. 962.) Resembling *A. divaricata;* lemma somewhat narrowed at summit but not twisted, central awn a little longer than the two lateral ones. ♃ —Dry hills and plains, western Texas to southern California, south to Guatemala (fig. 963). In Arizona more common than *A. divaricata*.

19. Aristida pátula Chapm. (Fig. 964.) Perennial, erect, as much as 1 m tall; blades flat, becoming involute especially at the slender tip, elongate, 2 to 4 mm wide; panicle loose and open, one third to half the entire length of the culm, the branches drooping, naked below, as much as 20 cm long; glumes 12 to 15 mm long, nearly equal; lemma 10 to 12 mm long; central awn straight, 2 to 2.5 cm long, the lateral scarcely diverging, 5 to 10 mm long. ♃ —Moist sandy pine barrens and low open ground, peninsular Florida.

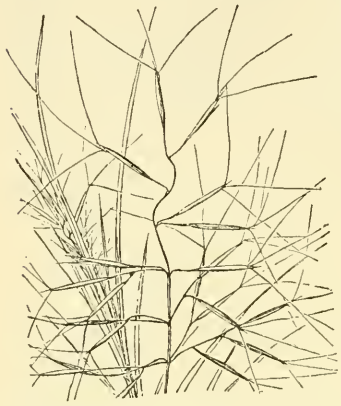

FIGURE 959.—*Aristida barbata*, × 1. (Wooton, N.Mex.)

20. Aristida pánsa Woot. and Standl. WOOTON THREE-AWN. (Fig. 965.) Perennial; culms stiffly erect, slender, wiry, 20 to 40 cm tall; blades closely involute, 0.5 mm thick; panicle narrow, open, rather stiffly upright, 10 to 20 cm long, the branches stiffly ascending, 4 to 8 cm long; first glume 5 to 7 mm long, the second 7 to 10 mm long; lemma about as long as the second glume, tapering into a scabrous slightly twisted beak about 2 mm long; awns about equal, divergent or finally nearly horizontally spreading, 10 to 20 mm long, the bases finally somewhat curved or warped. ♃ —Plains and open ground, western Texas to Arizona.

21. Aristida spicifórmis Ell. (Fig. 966.) Perennial; culms strictly erect, 50 to 100 cm tall; blades erect, flat or usually involute, elongate, 1 to 3 mm wide; panicle erect, dense and spikelike 10 to 15 cm long, more or less spirally twisted; glumes unequal, abruptly long-awned-

FIGURE 961.—Distribution of *Aristida divaricata*.

FIGURE 960.—*Aristida divaricata*, × 1. (Talbot, N.Mex.)

the first 4 mm long, the second 8 to 10 mm long, the awns usually 10 to 12 mm long; lemma 5 to 6 mm long, extending into a slender twisted column 1 to 3 cm long; awns about equal, 2 to 3 cm long, divergent or horizontally spreading, more or less curved or warped at base. ♃ —Pine barrens along the coast, South Carolina to Florida and Mississippi; Cuba, Puerto Rico (fig. 967).

22. Aristida glaúca (Nees) Walp. REVERCHON THREE-AWN. (Fig. 968.) Perennial; culms erect, 20 to 40 cm tall; blades involute, mostly curved or flexuous, 5 to 10 cm long, about 1 mm thick; panicle

FIGURE 962.—*Aristida hamulosa*. Panicle, × 1; floret, × 3. (Type.)

narrow, erect, rather few flowered, mostly 8 to 15 cm long, the branches stiffly appressed; first glume 5 to 8 mm long, the second

FIGURE 963.—Distribution of *Aristida hamulosa*.

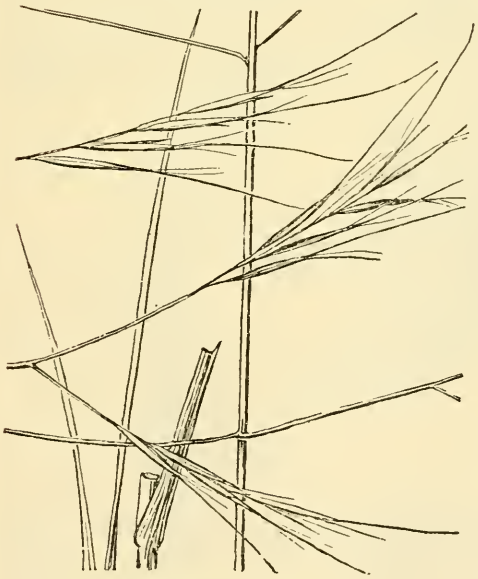

FIGURE 964.—*Aristida patula*, × 1. (Hitchcock, Fla.)

FIGURE 965.—*Aristida pansa*, × 1. (Wooton, N. Mex.)

about twice as long; lemma 10 to 12 mm long, tapering into a minutely scabrous, slender, somewhat twisted beak about half the total length of the lemma; awns equal, divergent or horizontally spreading, 1.5 to

2.5 cm long. ♃ (*A. reverchoni* Vasey.)—Dry or rocky hills and plains, Texas to Utah, Nevada, and southern California, south to Puebla, Mexico (fig. 969).

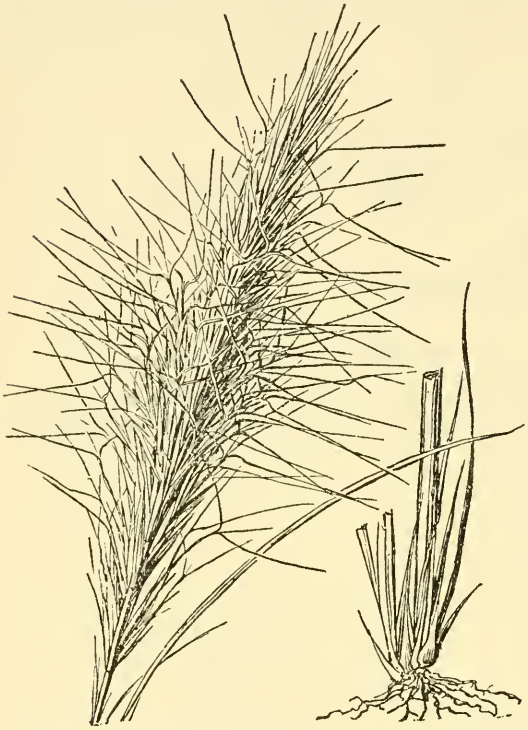

FIGURE 966.—*Aristida spiciformis*, × 1. (Combs and Baker 1115, Fla.)

23. Aristida purpúrea Nutt. PURPLE THREE-AWN. (Fig. 970.) Perennial, often in large tufts; culms 30 to 50 cm tall; blades usually involute and less than 10 cm long, 1 to 1.5 mm wide when unrolled;

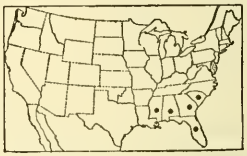

FIGURE 967.—Distribution of *Aristida spiciformis*.

panicle narrow, nodding, rather lax and loose, usually purplish, 10 to 20 cm long, the branches and longer pedicels capillary, more or less curved or flexuous; first glume 6 to 8 mm long, the second about twice as long; lemma about 1 cm long, the body tapering to a scarcely beaked summit, tuberculate-scabrous in lines from below the middle to the summit; awns nearly equal, spreading, 3 to 5 cm long. ♃ —Dry hills and plains, Arkansas and Kansas to Utah and southern

FIGURE 969.—Distribution of *Aristida glauca*.

California, south to northern Mexico (fig. 971). ARISTIDA PURPUREA var. LAXIFLÓRA Merr. Panicle few-flowered, the capillary branches bearing 1 or 2 spikelets. ♃ —Texas to Arizona.

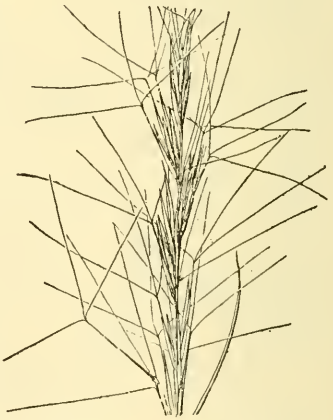

FIGURE 968.—*Aristida glauca*, × 1. (Reverchon 1237, Tex.)

24. Aristida roemeriána Scheele. (Fig. 972.) Differing from *A. purpurea* chiefly in the smaller spikelets; first glume 4 to 5 mm

long; lemma 7 to 8 mm long, the awns about 2 cm long. 2ł (*A. micrantha* Nash.)—Texas, New Mexico, and northern Mexico.

25. Aristida wrightii Nash. (Fig. 973.) Perennial; culms tufted, erect, 30 to 60 cm tall; sheaths villous at the throat and with a more or less hispid or villous line across the collar; blades involute, curved or flexuous; panicle erect, narrow, 15 to 20 cm long; first glume 6 to 7 mm

FIGURE 971.—Distribution of *Aristida purpurea*.

FIGURE 970.—*Aristida purpurea*, × 1. (Bush 665, Tex.)

long, the second about twice as long; lemma 10 to 12 mm long; awns nearly equal, about 2 cm long, divergent. 2ł —Dry plains and hills, Texas, Colorado, and Utah to southern California and central Mexico (fig. 974)

26. Aristida longiséta Steud. RED THREE-AWN. (Fig. 975.) Perennial, often in large bunches; culms 20 to 30 cm tall; blades involute, curved or flexuous, usually less than 15 cm long; panicle narrow, erect

but not stiff, few-flowered, the axis only a few cm long, the branches ascending or appressed, or the lower more or less curved or flexuous; first glume 8 to 10 mm long, the second about twice as long; lemma terete, 12 to 15 mm long, only slightly narrowed above, glabrous or

FIGURE 972.—*Aristida roemeriana*, × 1. (Swallen 1585, Tex.)

the upper part scaberulous but scarcely tuberculate-scabrous in lines as in *A. purpurea;* awns about equal, divergent, 6 to 8 cm long. 2↓ —Plains and foothills, North Dakota to Montana, south to Texas, Arizona, and northern Mexico (fig. 976). ARISTIDA LONGISETA var. RARIFLÓRA Hitchc. Differing in the few-flowered panicles with capillary flexuous branches bearing 1 or 2 spikelets. 2↓ —Texas to Colorado and Arizona.

FIGURE 973.—*Aristida wrightii*, × 1. (Ball 1511, Tex.)

ARISTIDA LONGISETA var. ROBÚSTA Merr. Taller and more robust, 30 to 50 cm tall, the blades

FIGURE 974.—Distribution of *Aristida wrightii.*

longer and not in conspicuous basal tufts, the panicle longer, stiffer, and the branches more stiffly ascending, the awns mostly 4 to 5 cm long. 2↓ —Same range but more common northward, extending east to Minnesota and west to Oregon and Washington.

27. Aristida fendleriána Steud. FENDLER THREE-AWN. (Fig. 977.) Resembling *A. longiseta;* differing in the numerous short curly blades at the base of the plant, the shorter glumes (the first about 7 mm long), the gradually narrowed lemma, scaberulous on the upper half,

and the shorter awns (2 to 5 cm long). 2l —Dry plains and hills, South Dakota to Montana, south to Texas, Utah, and southern California (fig. 978).

28. Aristida lanósa Muhl. (Fig. 979.) Perennial; culms solitary or few in a tuft, rather robust, 1 to 1.5 m tall; sheaths lanate-pubescent or rarely glabrous; blades flat, elongate, as much as 4 mm wide; panicle narrow, rather loose, as much as 40 cm long; first glume 12 to

FIGURE 975.—*Aristida longiseta*, × 1. (Thompson 63, Kan.)

14 mm long, the second about 10 mm, lemma 8 to 9 mm long; central awn horizontally spreading or reflexed from a curved base, 1.5 to 2.5 cm long, the lateral half to two-thirds as long, erect or spreading. 2l — Dry sandy soil of the Coastal Plain, New Jersey to Florida and Texas, north to Oklahoma and Missouri (fig. 980).

29. Aristida arizónica Vasey. ARIZONA THREE-AWN. (Fig. 981.) Perennial; culms erect, 30 to 120 cm tall; blades flat, narrowed to a fine involute point or some of them involute throughout, 1 to 4 mm wide, the old ones usually curled or flexuous; panicle narrow, erect, closely flowered or more or less interrupted at base, 10 to 25 cm long; glumes equal or nearly so, awn-pointed, 10 to 15 mm long; lemma 1 to 1.5 cm long, including the more or less twisted beak of about 3 to 5 mm; awns about equal, ascending, 1 to 2 cm long. 2l —Dry plains, stony hillsides, and open forest, mostly at 1,500 to 2,500 m altitude, southern Colorado, western Texas, New Mexico, and Arizona, south through Mexico (fig. 982).

FIGURE 976.—Distribution of *Aristida longiseta*.

30. Aristida strícta Michx. PINELAND THREE-AWN. (Fig. 983.) Perennial; culms erect, 50 to 100 cm tall; blades closely involute, villous on the upper surface above the base (the hairs visible without unrolling the blade), elongate, 1 mm thick; panicle slender, as much as 30 cm long; glumes about equal, 7 to 9 mm long; lemma about 6

mm long, scarcely beaked; awns divergent, the central 1 to 1.5 cm long, the lateral a little shorter. ♃ —Common in pine barrens, North Carolina to Florida, west to Mississippi (fig. 984).

31. Aristida rhizomóphora Swallen. (Fig. 985.) Perennial; culms tufted, erect, 65 to 80 cm tall, producing well developed scaly rhizomes; blades firm, flat or folded, 7 to 10 cm long, 1 to 2 mm wide, those of the innovations flexuous, as much as 30 cm long; panicle flexuous, 20 to

FIGURE 977.—*Aristida fendleriana*, × 1. (Coville 1089, Ariz.)

FIGURE 978.—Distribution of *Aristida fendleriana*.

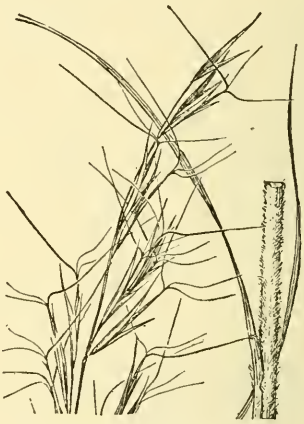

FIGURE 979.—*Aristida lanosa*, × 1. (Canby, Md.)

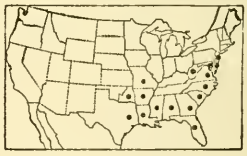

FIGURE 980.—Distribution of *Aristida lanosa*.

30 cm long, the distant branches somewhat spreading, few-flowered, spikelet-bearing from near the base; glumes acuminate, usually awned, the first 8 to 14 mm long, the second 12 to 17 mm long (including the awn); lemma 9 to 12 mm long, the callus 1 mm long, the awns flexuous, curved or loosely twisted at base, spreading, the central often reflexed by a semicircular bend, 18 to 28 mm long, the lateral 15 to 20 mm long. ♃ —Prairies, peninsular Florida.

32. Aristida purpurascens Poir. ARROWFEATHER. (Fig. 986.) Perennial; culms tufted from a rather thin weak sometimes decumbent

base, slender, 40 to 70 cm or even 1 m tall; blades flat, rather lax and flexuous (especially the old ones), usually less than 2 mm wide; panicle narrow, rather lax and nodding, one-third to half the entire length of the culm; glumes about equal, 9 to 12 mm long; lemma about 7 mm long; awns about equal, divergent or somewhat reflexed, 1.5 to 2.5 cm long. ♃ —Dry sandy soil, Massachusetts to Kansas, south to Florida and Texas (fig. 987).

FIGURE 981.—*Aristida arizonica*, × 1; (Rusby, Ariz.)

FIGURE 982.—Distribution of *Aristida arizonica*.

33. Aristida parishii Hitchc. (Fig. 988.) Perennial; culms erect, 30 to 50 cm tall; blades more or less involute, sometimes flat, 1 to 2 mm wide; panicle narrow, about 15 cm long; glumes short-awned, the first 12 mm long, the second 1 or 2 mm longer; lemma about 12 mm long, tapering into a short straight or obscurely twisted beak; awns about equal, divergent, about 2.5 cm long. ♃ —Dry or rocky soil, Arizona and southern California.

34. Aristida affinis (Schult.) Kunth. (Fig. 989.) Perennial; culms tufted from a hard thickened base, stiffly erect, rather stout, 1 to 1.5 m tall; blades flat, becoming loosely involute, elongate, as much as 3 mm wide; panicle narrow, virgate, as much as 50 cm long; glumes equal, about 12 mm long, the first with a distinct nerve on one side (thus 2-nerved); lemma 8 mm long, the straight beak about 1 mm long; central awn horizontally spreading, 1.5 to 3 cm long, the lateral awns erect, two-thirds to three-fourths as long. ♃ (*A. palustris* Vasey.)—Low pine barrens and flatwoods, North Carolina and Kentucky to Florida and Texas, on the Coastal Plain (fig. 990).

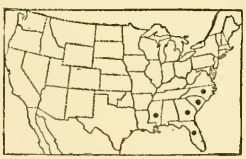

FIGURE 984.—Distribution of *Aristida stricta*.

FIGURE 983.—*Aristida stricta*, × 1: (Chase 4565, N. C.)

35. Aristida virgata Trin. (Fig. 991.) Perennial; culms tufted from a rather slender soft base, erect, 50 to 80 cm tall; blades flat, rather lax, usually not

more than 2 mm wide; panicle slender, erect, though not very stiff, rather loosely flowered, one-third to half the entire length of the culm; glumes about equal, 6 to 7 mm long; lemma 4 to 5 mm long; central awn horizontally spreading or somewhat reflexed, 1.5 to 2 cm long, the lateral awns erect, about two-thirds as long as the central. 2↓ (*A. chapmaniana* Nash.)—Moist sandy soil of the Coastal Plain, New Jersey to Florida and Texas (fig. 992).

36. Aristida simpliciflóra Chapm. (Fig. 993.) Perennial; culms erect from a rather delicate base, slender, 30 to 60 cm tall; blades flat, 5 to 15 cm long, 1 mm wide; panicle slender, somewhat nodding, 10

FIGURE 985.—*Aristida rhizomophora*. Plant, × ½; spikelet, × 2; two views of callus, × 10. (Type.)

to 20 cm long, few-flowered, the spikelets mostly in pairs; glumes equal, 6 to 7 mm long; lemma a little shorter than the glumes; central awn finally reflexed by a semicircular bend, 1 to 1.5 cm long, the lateral awns horizontally spreading, a little shorter than the central one. 2↓ —Moist pine woods, rare, western Florida; Mississippi (McNeill).

37. Aristida móhrii Nash. (Fig. 994.) Perennial; culms erect, 40 to 60 cm tall; blades flat or those of the innovations involute, 10 to 15 cm long, 1 to 2 mm wide, the uppermost reduced; panicle slender, strict, as much as 30 cm long; spikelets solitary, appressed, distant,

FIGURE 987.—Distribution of *Aristida purpurascens*.

FIGURE 990.—Distribution of *Aristida affinis*.

FIGURE 986.—*Aristida purpurascens*, × 1. (Chase 4563, N.C.)

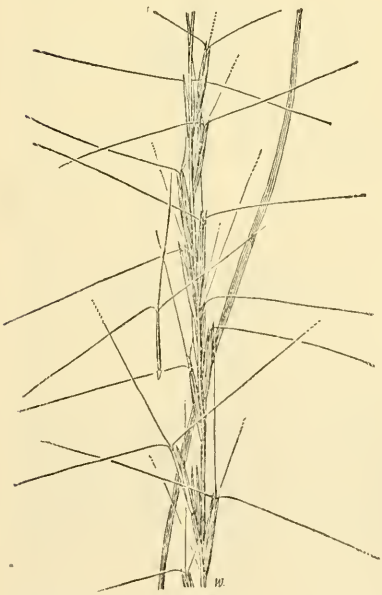

FIGURE 989.—*Aristida affinis*, × 1. (Combs 688, Fla.)

FIGURE 988.—*Aristida parishii*, ×1. (Parish 1029A, Calif.)

even the upper not overlapping; glumes equal, firm, rather broad toward the mucronate apex, 1 cm long; lemma terete, a little shorter than the glumes; awns divergent, the central one reflexed by a semicircular bend near the base, 1.5 to 2 cm long, the lateral ones scarcely shorter than the central, horizontally spreading or reflexed. 2l — Known only from Spring Hill, near Mobile, Ala.

38. Aristida tenuispica Hitchc. (Fig. 995.) Perennial; culms slender, 60 to 100 cm tall; blades flat, 10 to 20 cm long, 1 to 2

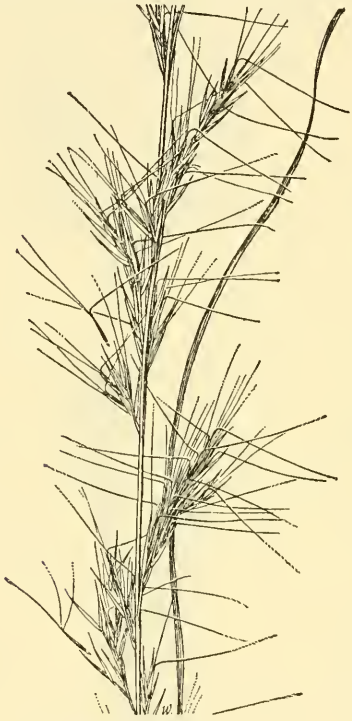

FIGURE 991.—*Aristida virgata*, × 1. (Tracy 4667, Miss.)

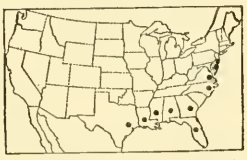

FIGURE 992.—Distribution of *Aristida virgata*.

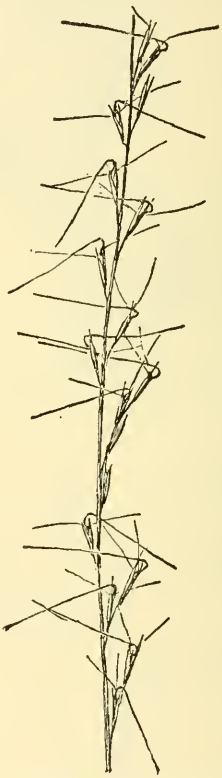

FIGURE 993.—*Aristida simpliciflora*, × 1. (Chapman, Fla.)

mm wide, bearing scattered long hairs on the upper surface; panicle slender, about half the entire length of the culm; glumes nearly equal, about 8 mm long; lemma 7 mm long including a 1 mm long beak; awns equal, 12 to 15 mm long, spreading or reflexed, somewhat spirally contorted at base. 2l —Low pine barrens, peninsular Florida.

39. Aristida condensáta Chapm. (Fig. 996.) Perennial; culms rather robust, a meter or more tall; blades firm, flat, becoming involute, elongate, 2 to 3 mm wide; panicle narrow, as much as 30 cm long, the branches 5 to 10 cm long, ascending, closely flowered; glumes equal, 8 to 9 mm long; awns equal, divergent, 10 to 15 mm long, the base more or less contorted, finally forming a loose spiral. 2¼ —Sandy pine or oak barrens, Georgia, Florida, and Alabama, on the Coastal Plain.

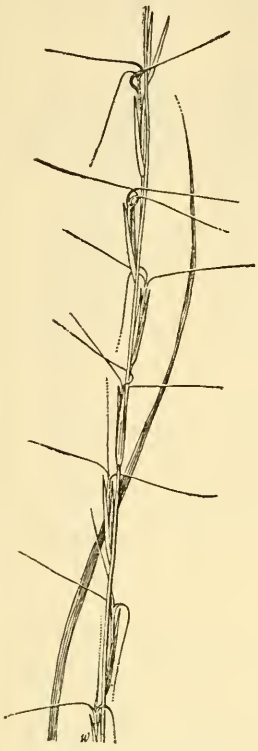

FIGURE 994.—*Aristida mohrii*, × 1. (Mohr 53, Ala.)

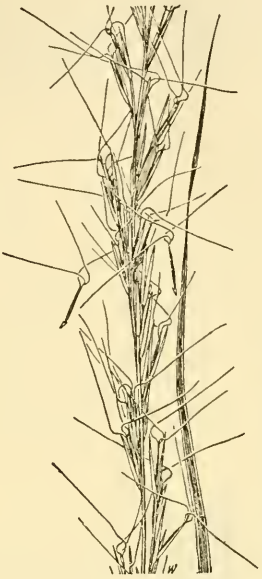

FIGURE 995.—*Aristida tenuispica*, × 1. (Tracy 7104, Fla.)

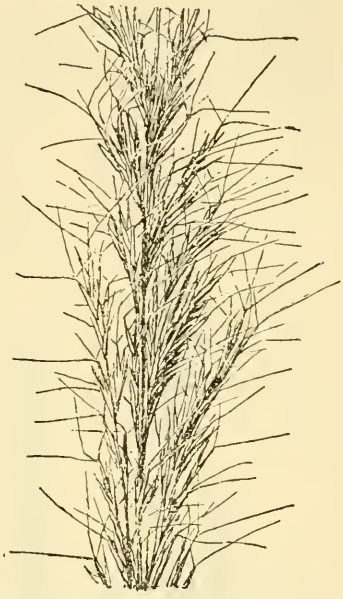

FIGURE 996.—*Aristida condensata*, × 1. (Chapman, Fla.)

40. Aristida gýrans Chapm. (Fig. 997.) Perennial; culms erect, slender, 40 to 70 cm tall; blades involute, 10 to 15 cm long, 1 mm wide; panicle slender, rather lax, 15 to 30 cm long, the branches appressed, not at all or only slightly overlapping, bearing mostly 1 to 3 spikelets; first glume 7 to 8 mm long, the second 10 to 11 mm long; lemma about 6 mm long, the callus 1.5 mm long, sharp; awns equal, divergent, 1 to 1.5 cm long, about equally contorted at base in a loose spiral. 2¼ —Dry sandy soil, Georgia and Florida.

FIGURE 997.—*Aristida gyrans*, × 1. (Combs 1289, Fla.)

TRIBE 6. ZOYSIEAE

86. TRÁGUS Hall.

(*Nazia* Adans.)

Spikelets 1-flowered, in small spikes of 2 to 5, the spikes subsessile, falling entire, the spikelets sessile on a very short zigzag rachis, the first glumes small, thin, or wanting, appressed to the rachis, the second

FIGURE 998.—*Tragus berteronianus*. Plant, × ½; bur and spikelet, × 5. (Hitchcock 3745, N.Mex.)

glumes of the two lower spikelets strongly convex with 3 thick nerves bearing a row of squarrose, stout hooked prickles along each side, the two second glumes forming the halves of a little bur, the upper 1 to 3 spikelets reduced and sterile; lemma and palea thin, the lemma flat, the palea strongly convex. Low annuals, with flat blades and terminal inflorescence, the burs or spikes rather closely arranged along an elongate, slender axis. Type species, *Tragus racemosus*. Name from Greek *tragos*, he-goat, applied by Plinius to a plant.

Spikelets 2 to 3 mm long, the apex scarcely projecting beyond the spines, the bur nearly sessile ..... 1. T. BERTERONIANUS.
Spikelets 4 to 4.5 mm long, the acuminate apex projecting beyond the spines, the bur pediceled ..... 2. T. RACEMOSUS.

1. Tragus berteroniánus Schult. (Fig. 998.) Culms branched at base, spreading, 10 to 40 cm long; blades firm, mostly less than 5 cm long, 2 to 4 mm wide, the cartilaginous margin bearing stiff white hairs or short slender teeth; raceme dense, 4 to 10 cm long, 4 to 5 mm thick; burs 2 to 3 mm long, nearly sessile, the apex scarcely exceeding the spines. ⊙ (The name *Nazia aliena* Scribn. has been erroneously applied to the species.)—Dry open ground, probably introduced, Texas to Arizona, south to Argentina; also in the warmer parts of the Old World; on ballast at Boston and on wool waste in Maine.

FIGURE 999.—*Tragus racemosus*, × 1. (Griffiths 1529, Ariz.)

FIGURE 1000.—Distribution of *Tragus racemosus*.

2. Tragus racemósus (L.) All. (Fig. 999.) Differing from *T. berteronianus* in the larger burs, the spikelets 4 to 4.5 mm long, in the acuminate apex projecting beyond the spines, and in the pediceled burs. ⊙ (*Nazia racemosa* Kuntze.)—Waste ground and on ballast at a few places from Maine to North Carolina; Texas to Arizona (fig. 1000); introduced from the Old World.

ANTHÉPHORA Schreb.

Spikelets with 1 perfect floret and a sterile lemma below, in clusters of 4, the indurate first glumes united at base, forming a pitcher-shaped pseudo-involucre, the clusters subsessile and erect on a slender flexuous continuous axis, deciduous at maturity. Type species, *Anthephora elegans* Schreb. (*A. hermaphrodita*). Name from *anthe*, blossom, and *pherein*, to bear.

Anthephora hermaphrodíta (L.) Kuntze. Leafy ascending or decumbent annual; culms mostly 20 to 50 cm tall; blades flat, thin, 5 to 10 mm wide; spikes erect, 5 to 10 cm long; first glume 5 to 7 mm long, about 9-nerved; second glume narrow, acuminate, shorter than the first, pubescent; sterile lemma 5-nerved, about as long as the fertile floret. ⊙ —Escaped from Experiment Station plots, Florida (Gainesville); a common weed in tropical America.

87. ZOÝSIA Willd.

(*Osterdamia* Neck.)

Spikelets 1-flowered, laterally compressed, appressed flatwise against the slender rachis, glabrous, disarticulating below the glumes; first glume wanting; second glume coriaceous, mucronate, or short-awned, completely infolding the thin lemma and palea, the palea sometimes obsolete. Low perennials, with creeping rhizomes, short, pungently pointed blades, and terminal spikelike racemes, the spikelets on short appressed pedicels. Type species, *Zoysia pungens* Willd. Named for Karl von Zois.

Several years ago a species of this genus was introduced into the United States as a lawngrass under the names Korean lawngrass and Japanese lawngrass. It was recommended for the Southern States and was said to be hardy as far north as Connecticut. The species

then introduced appears to be *Zoysia japonica* Steud. Recently a fine-leaved species, *Zoysia tenuifolia* Willd. (Mascarene grass), has been introduced in Florida and southern California (called in the latter region Korean velvet grass) and has given favorable results. These species may escape from cultivation. The original species, *Z. matrella* (L.) Merr. (*Z. pungens* Willd.), called Manila grass (fig. 1001), is common in the Philippine Islands.

FIGURE 1001.—*Zoysia matrella*. Plant, × ½; spikelet and floret, × 10. (Whitford 1303, P.I.)

In *Z. japonica* (Japanese lawngrass) the blades are flat and rather stiff, 2 to 4 mm wide, the spikelets about 3 mm long and a little more than 1 mm wide. The rhizomes are underground. In *Z. tenuifolia* the blades are involute-capillary, the spikelets much narrower than in *Z. japonica*. The stolons are at or near the surface of the soil. In *Z. matrella* the spikelets are about 2.5 mm long and a little less than 1 mm wide.

88. HILÁRIA H.B.K.

Spikelets sessile, in groups of 3, the groups falling from the axis entire, the central spikelet (next the axis) fertile, 1-flowered (occasionally 2-flowered), the 2 lateral spikelets staminate, 2-flowered (occasionally 3-flowered); glumes coriaceous, those of the 3 spike-

FIGURE 1002.—*Hilaria belangeri*. Plant, × ½; single spike, × 1; group of spikelets, two views (*A*), × 5; fertile spikelet (*B*), staminate spikelet (*C*), and fertile floret (*D*), × 5. (Hitchcock, Tex.)

lets forming a false involucre, in some species connate at the base, more or less asymmetric, usually bearing an awn on one side from about the middle (extension of the midnerve of the asymmetric glume); lemma and palea hyaline, about equal in length. Perennials, with stiff, solid culms and narrow blades, the groups of spikelets

appressed to the axis, in terminal spikes. Type species, *Hilaria cenchroides* H.B.K. Named for Auguste St. Hilaire.

All the species are important range grasses. Curly mesquite is the dominant "short grass" of the Texas plains. The larger species are well known on the range in the arid and semiarid regions of the Southwest. They resist close grazing.

Culms white felty pubescent ..... 4. H. RIGIDA.
Culms not felty pubescent.
  Cluster of spikelets not flabellate; glumes of lateral spikelet narrowed toward summit ..... 3. H. JAMESII.
  Cluster of spikelets flabellate; glumes (at least the outer one) of lateral spikelets broadest toward summit.
    Glumes subhyaline and fimbriate at summit; plants tufted, not stoloniferous ..... 2. H. MUTICA.
    Glumes firm, not fimbriate; plants stoloniferous (except in var. *longifolia*) ..... 1. H. BELANGERI.

FIGURE 1003.—*Hilaria mutica*, × 1. (Toumey, Ariz.)

1. Hilaria belangéri (Steud.) Nash. CURLY MESQUITE. (Fig. 1002.) Plants in tufts, sending out slender stolons, these producing new tufts, the internodes of the stolons wiry, 5 to 15 cm long; culms erect, slender, 10 to 30 cm tall, villous at the nodes; blades flat, curly, 1 to 2 mm wide, usually short, crowded at base, forming a curly tuft, but sometimes longer and erect; spike usually 2 to 3 cm long, with mostly 4 to 8 clusters of spikelets, the axis flat, the internodes alternately curved, 3 to 5 mm long; group of spikelets 5 to 7 mm long; lateral spikelets attenuate at base, the glumes united below, firm, scabrous, the outer lobe broadened upward, 2- to 3-nerved, the inner much reduced, the midnerve of both glumes extending into short awns, the first glume smaller, the lateral nerves sometimes excurrent into awns or teeth (the glumes variable in a single spike); fertile spikelet usually shorter than the sterile, rounded at base; glumes firm with deeply lobed thinner upper part, the midnerves extending into awns mostly exceeding the staminate spikelets; lemma compressed, narrowed above, awnless. 2↓ (*H. texana* Nash.)—Mesas and plains, Texas to Arizona and northern Mexico. *H. cenchroides* H.B.K., to which this species has commonly been referred, is confined to Mexico. HILARIA BELANGERI var. LONGIFÓLIA (Vasey) Hitchc. Stolons wanting; blades elongate. 2↓ (*H. longifolia* Vasey.)— Arizona and Sonora.

2. Hilaria mútica (Buckl.) Benth. TOBOSA GRASS. (Fig. 1003.) Culms from a tough rhizomatous base, 30 to 60 cm tall, glabrous, the nodes pubescent; blades flat or somewhat involute, rather rigid, 2 to 3 mm wide; spikes 4 to 6 cm long; group of spikelets about 7 mm long; bearded at base; glumes of lateral spikelets very unsymmetrical,

FIGURE 1004.—*Hilaria jamesii*. Plant, × ½; single spike, × 1; group of spikelets, two views (*A*), × 5; fertile spikelet (*B*), staminate spikelet (*C*), and fertile floret (*D*), × 5. (Tidestrom 1449, Utah.)

widened toward the ciliate summit, the nerves flabellate, not excurrent or barely so; fertile spikelet about equaling the lateral ones, its glumes strongly keeled, cleft into few to several narrow ciliate lobes and slender awns; lemma exceeding the glumes, mucronate between 2 rounded lobes. 2↓ (*Pleuraphis mutica* Buckl.)—Dry plains and hills, Texas to Arizona and northern Mexico.

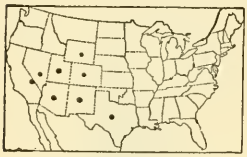

FIGURE 1005.—Distribution of *Hilaria jamesii*.

3. Hilaria jamésii (Torr.) Benth. GALLETA. (Fig. 1004.) Plants erect, the base often decumbent or rhizomatous, bearing also tough scaly rhizomes; culms glabrous, the nodes villous; sheaths glabrous or slightly scabrous, sparingly villous around the short membranaceous ligule; blades mostly 2 to 5 cm long, 2 to 4 mm wide, rigid, soon involute, the upper reduced; group of spikelets 6 to 8 mm long, long-villous at base, similar to those of *H. rigida*, but the glumes of lateral spikelets acute, usually with a single awn; lemma of the fertile spikelet exceeding its glumes. 2↓ (*Pleuraphis jamesii* Torr.)—Deserts, canyons, and dry plains, Wyoming and Utah to Texas and Inyo County, Calif. (fig. 1005).

FIGURE 1006.—*Hilaria rigida*, × 1. (Palmer 494, Utah.)

4. Hilaria rígida (Thurb.) Benth. BIG GALLETA. (Fig. 1006.) Plants rather robust at base, branching, the branches mostly erect or ascending, the base rather woody, decumbent or rhizomatous; culms numerous, rigid, felty-pubescent, glabrate and scabrous above, 50 to 100 cm tall; leaves felty or glabrous, usually woolly at the top of the sheath; blades spreading, 2 to 5 cm long, or longer on sterile shoots, 2 to 4 mm wide, more or less involute, acuminate into a rigid coriaceous point; group of spikelets about 8 mm long, densely bearded at base; glumes of lateral spikelets thin, long-ciliate, about 7-nerved, usually 2- to 4-lobed at the broad summit and with 1 to 3 nerves excurrent into slender awns, nerves sometimes obscure and scarcely

excurrent (variable in a single spike); fertile spikelet about equaling the lateral ones, its narrow glumes deeply cleft into few to several acuminate ciliate lobes and slender awns; lemma scarcely exceeding the glumes, thin, ciliate, 2-lobed, the midnerve excurrent into a short awn. 2l (*Pleuraphis rigida* Thurb.)—Deserts, southern Utah and Nevada to southern California and Sonora (fig. 1007).

89. AEGOPÓGON Humb. and Bonpl.

Spikelets short-pedicellate, in groups of 3, the group short-pedunculate, spreading, the peduncle disarticulating from the axis and forming a pointed stipe below the group, this falling entire; central spikelet shorter pedicellate, fertile, the 2 lateral ones longer pedicellate and staminate or neuter; glumes membranaceous, notched at the apex, the midnerve extending into a delicate awn; lemma and palea thinner than the glumes, extending beyond them, the lemma 3-nerved, the central nerve and sometimes also the lateral ones extending into awns, the palea 2-awned. Low, lax annuals, with short, narrow, flat blades and loose racemes of delicate groups of spikelets. Type species, *Aegopogon cenchroides* Humb. and Bonpl. Name from Greek *aix*, goat, and *pogon*, beard, alluding to the fascicle of awns of the spikelets.

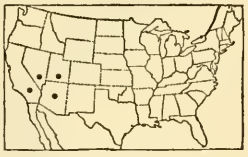

FIGURE 1007.—Distribution of *Hilaria rigida*.

1. Aegopogon tenéllus (Cav.) Trin. (Fig. 1008.) Culms 10 to 20 cm long, usually spreading or decumbent; blades 1 to 2 mm wide; racemes 3 to 5 cm long; spikelets, excluding awns, about 2 mm long; lemma and palea of lateral spikelets broad and rounded at summit with a single delicate awn, those of the fertile spikelet narrower, with one long and 2 short awns. ⊙ —Open ground, mountains of southern Arizona and south to northern South America.

TRIBE 7. CHLORIDEAE

90. LEPTÓCHLOA Beauv. Sprangletop

Spikelets 2- to several-flowered, sessile or short-pediceled, approximate or somewhat distant along one side of a slender rachis, the rachilla disarticulating above the glumes and between the florets; glumes unequal or nearly equal, awnless or mucronate, 1-nerved, usually shorter than the first lemma; lemmas obtuse or acute, sometimes 2-toothed and mucronate or short-awned from between the teeth, 3-nerved, the nerves sometimes pubescent. Annuals or perennials, with flat blades and numerous usually slender spikes or racemes borne on a common axis forming a long or sometimes short panicle. Type species, *Leptochloa virgata*. Name from Greek *leptos*, slender, and *chloa*, grass, alluding to the slender spikes.

The only species of *Leptochloa* important as a forage grass is *L. dubia*, or sprangletop, of the Southwest, useful for grazing and for hay.

Plants perennial.
Lemmas broad, notched at apex, the lateral nerves glabrous---- 1. L. DUBIA.
Lemmas acute or awned, the lateral nerves pubescent.
Lemmas about 3 mm long; panicle flabellate, the axis short.
2. L. CHLORIDIFORMIS.

FIGURE 1008.—*Aegopogon tenellus*. Plant, × ½; group of spikelets, × 5; lateral spikelets and central spikelet, × 10. (Pringle 1407, Mexico.)

Lemmas about 1.5 mm long; panicle oblong, the axis relatively long.
Sheaths and blades glabrous; lemmas awnless or nearly so.
3. L. VIRGATA.
Sheaths and blades sparsely pilose; lemmas awned.. 4. L. DOMINGENSIS.
Plants annual.
Sheaths papillose-pilose; first floret not longer than the second glume; spikelets mostly 1 to 2 mm long..... 5. L. FILIFORMIS.
Sheaths smooth or scabrous, not pilose; spikelets more than 2 mm long.
Lemmas awned, awns sometimes minute. Culms freely branching.
Lemmas viscid on the back; panicle oval, usually less than 10 cm long, the longer branches usually less than 5 cm long; second glume 1.5 mm long..... 6. L. VISCIDA.
Lemmas not viscid; panicle more than 10 cm long, the longer branches usually as much as 10 cm long; second glume 3 mm long.
7. L. FASCICULARIS.

Lemmas awnless or mucronate only.
Florets obtuse, sometimes mucronate.
Spikelets 5 to 7 mm long, 6- to 9-flowered, lead color. 8. L. UNINERVIA.
Spikelets 2 to 3 mm long, 3- to 4-flowered, pale ..... 9. L. NEALLEYI.
Florets acuminate.
Sheaths scabrous, keeled and compressed ..... 10. L. SCABRA.
Sheaths smooth or slightly scabrous near apex, scarcely keeled or compressed ..... 11. L. PANICOIDES.

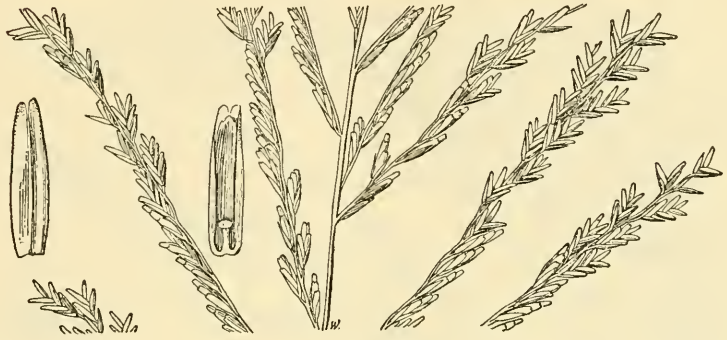

FIGURE 1009.—*Leptochloa dubia.* Panicle, × 1; two views of floret, × 10. (Small, Carter, and Small 3572, Fla.)

1. Leptochloa dúbia (H. B. K.) Nees. GREEN SPRANGLETOP. (Fig. 1009.) Perennial; culms wiry, erect, 50 to 100 cm tall; sheaths glabrous; blades flat or sometimes folded or loosely involute, scabrous, as much as 1 cm wide, but usually narrower; panicle of few to many spreading or ascending racemes 3 to 12 cm long, approximate or somewhat distant on an axis as much as 15 cm long; spikelets 5- to 8-flowered or in reduced specimens only 2-flowered, 5 to 10 mm long; lemmas broad, glabrous on the internerves, obtuse or emarginate, the midnerve sometimes extending into a short point, the florets at maturity widely spreading, very different in appearance from their early phase. 2n —Rocky hills and canyons and sandy soil, southern Florida; Oklahoma (Fort Sill) and Texas to Arizona, south through Mexico; (fig. 1010) Argentina. Racemes of cleistogamous spikelets are often found in the sheaths.

FIGURE 1010.—Distribution of *Leptochloa dubia.*

2. Leptochloa chloridiformis (Hack.) Parodi. (Fig. 1011.) Robust tufted perennial, somewhat glaucous; culms erect, 80 to 150 cm tall; sheaths scaberulous; ligule a dense line of white hairs, 1 to 2 mm long; blades erect, elongate, flat, rather firm, 3 to 4 mm wide, villous on the upper surface near the base, the margins scabrous, long-attenuate; panicle long-exserted; spikes numerous (usually 10 to 15), pale or stramineous, erect at base, flabellate or outcurved above, 10 to 15 cm long, aggregate in 2 or 3 whorls on an axis 3 to 4 cm long; spikelets closely imbricate on a rachis 0.5 mm wide, about 4-flowered, about 4 mm long; glumes acute, the first 1.5 mm long, the second 2.5 to 3 mm long; lemmas keeled, pilose on the margins nearly to apex, the midnerve extending beyond the obtuse tip as a minute mucro, the first and second florets about 3 mm long, the other shorter, not

extending much beyond the first two. ♃ —Dry open ground, Cameron County, Tex.; Paraguay and Argentina.

3. Leptochloa virgáta (L.) Beauv. (Fig. 1012.) Perennial; culms wiry, erect, 50 to 100 cm tall; blades flat; racemes several to many,

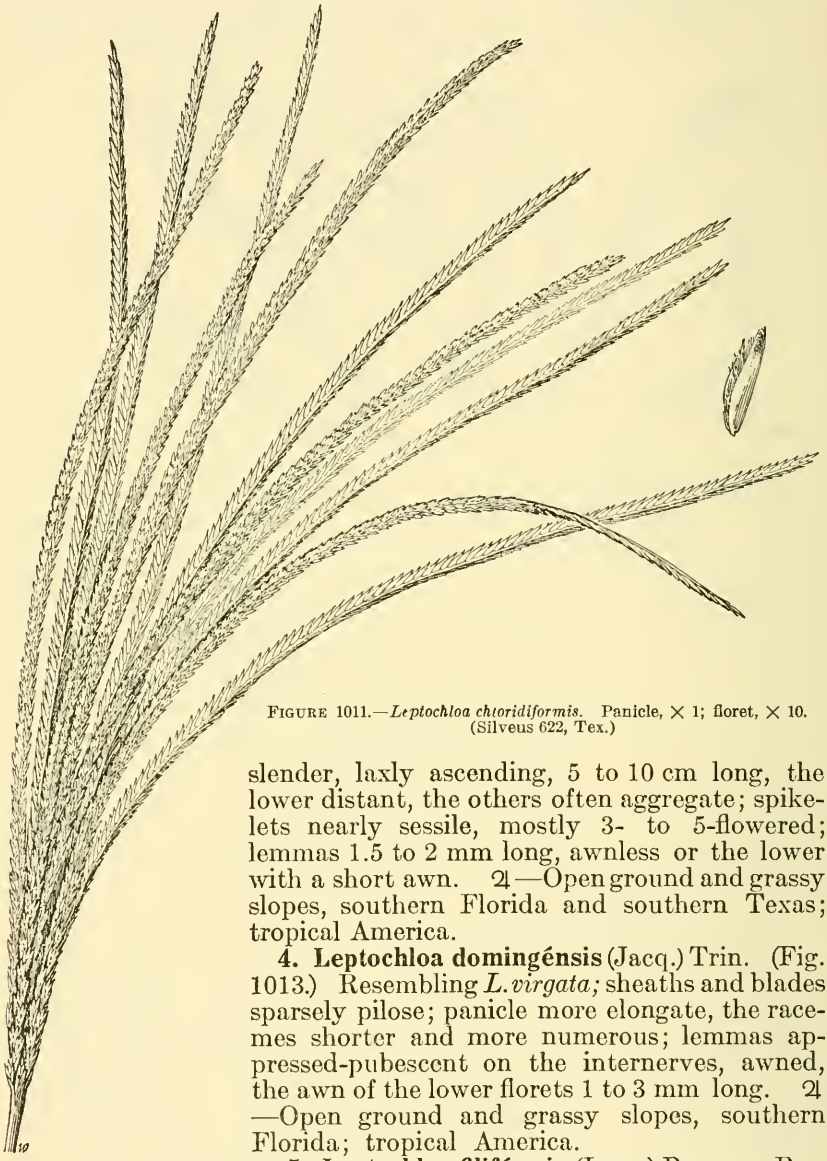

FIGURE 1011.—*Leptochloa chloridiformis.* Panicle, × 1; floret, × 10. (Silveus 622, Tex.)

slender, laxly ascending, 5 to 10 cm long, the lower distant, the others often aggregate; spikelets nearly sessile, mostly 3- to 5-flowered; lemmas 1.5 to 2 mm long, awnless or the lower with a short awn. ♃—Open ground and grassy slopes, southern Florida and southern Texas; tropical America.

4. Leptochloa domingénsis (Jacq.) Trin. (Fig. 1013.) Resembling *L. virgata;* sheaths and blades sparsely pilose; panicle more elongate, the racemes shorter and more numerous; lemmas appressed-pubescent on the internerves, awned, the awn of the lower florets 1 to 3 mm long. ♃ —Open ground and grassy slopes, southern Florida; tropical America.

5. Leptochloa filifórmis (Lam.) Beauv. RED SPRANGLETOP. (Fig. 1014.) Annual; the foliage and panicles often reddish or purple; culms erect, or often branching and geniculate below, 40 to 70 cm tall, or often dwarf; sheaths papillose-pilose, sometimes sparsely so; blades flat, thin, as much as 1 cm wide; panicle somewhat viscid, of numerous approximate slender racemes 5 to 15 cm long, on

an axis mostly about half the entire length of the culm; spikelets 3- to 4-flowered, 1 to 2 mm long, rather distant on the rachis; glumes acuminate, longer than the first floret, often as long as the spikelet; lemmas awnless, pubescent on the nerves, 1.5 mm long. ⊙ (*L. mucronata* Kunth.)—Open or shady ground, a common weed in gardens and fields, Virginia to southern Indiana and eastern Kansas, south to Florida and Texas, west to southern California; Massa-

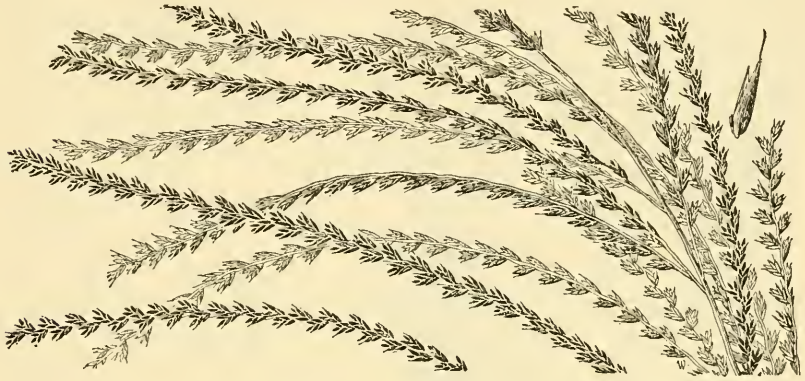

FIGURE 1012.—*Leptochloa virgata.* Panicle, × 1; floret, × 10. (Wilson 9402, Cuba.)

chusetts; throughout tropical America (fig. 1015). Much of the material from the Southwest has shorter racemes. Smaller forms occur throughout. These have been called *L. attenuata* (Nutt.) Steud.

6. Leptochloa víscida (Scribn.) Beal. (Fig. 1016.) Annual, freely branching at base and from all the nodes, spreading or prostrate, the foliage and panicles somewhat viscid; culms 10 to 30 cm tall; blades

FIGURE 1013.—*Leptochloa domingensis.* Panicle, × 1; floret, × 10. (Hitchcock 10055, Trinidad.)

flat; panicles ovoid, rather dense, 1 to 8 cm long, tinged with purple, included at base; spikelets 3 to 5 mm long, 5- to 7-flowered; lemmas pubescent on the nerves, about 2 mm long, short-awned. ⊙ —Open ground and waste places, New Mexico, Arizona, and northern Mexico.

7. Leptochloa fasciculáris (Lam.) A. Gray. (Fig. 1017.) Annual, somewhat succulent; culms erect to spreading or prostrate, freely branching, 30 to 100 cm tall; blades flat to loosely involute; panicles more or less included, mostly 10 to 20 cm long, often smaller, occasionally longer, the racemes several to numerous, as much as 10 cm

FIGURE 1014.—*Leptochloa filiformis.* Plant, × ½; spikelet and floret, × 10. (Ruth 51, Tenn.)

long, usually ascending or appressed, or at maturity spreading; spikelets usually overlapping, 7 to 12 mm long, 6- to 12-flowered; lemmas 4 to 5 mm long, the lateral nerves pubescent below, acuminate, the awn from short to as long as the body. ⊙ (*Diplachne fascicularis* Beauv.)—Brackish marshes along the coast, New Hampshire to Florida and Texas and in alkali flats, ditches, and marshes, Illinois and South Dakota to Texas, west through Colorado and New Mexico to California; also Washington (Bingen) and Oregon; south through tropical America to Argentina (fig. 1018.) A prostrate form has been called *Diplachne procumbens* (Muhl.) Nash and *D. maritima* Bickn.

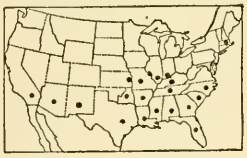

FIGURE 1015.—Distribution of *Leptochloa filiformis.*

8. Leptochloa uninérvia (Presl) Hitchc. and Chase. (Fig. 1019.) Resembling *L. fascicularis*, rather sparingly branching, usually strictly erect, the panicle more oblong in outline, with shorter, denser-flowered racemes; spikelets 5 to 7 mm long, 6- to 9-flowered, lead-color; glumes broader, more obtuse; lemmas scarcely narrowed toward tip, apiculate but not awned, the lateral nerves more or less excurrent. ⊙ (*L. imbricata* Thurb.)—Ditches and moist places, Mississippi to Colorado and southern California, south to Mexico; Peru to Argentina; introduced from Maine to New Jersey (fig. 1020).

FIGURE 1016.—*Leptochloa viscida.* Panicle, × 1; floret, × 10. (Mearns 833, Ariz.)

9. Leptochloa nealléyi Vasey. (Fig. 1021.) Annual, usually erect and rather robust; culms mostly 1 to 1.5 m tall, simple or sparingly branching at base; sheaths glabrous or slightly scabrous, mostly keeled; blades elongate, flat to loosely involute; panicle commonly 25 to 50 cm long, not more than 4 cm wide, the racemes subverticillate, overlapping, 2 to 4 cm long, appressed or ascending; spikelets crowded, 3- or 4-flowered, 2 to 3 mm long; lemmas about 1.5 mm long, the apex obtuse, the nerves sparingly pubescent, the lateral close to the margin. ⊙ —Marshes, mostly near the coast, Louisiana (Cameron) and Texas; also eastern Mexico.

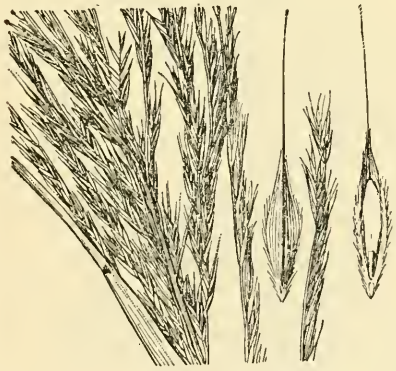

FIGURE 1017.—*Leptochloa fascicularis.* Panicle, × 1; two views of floret, × 10. (Hitchcock 7876, Md.)

FIGURE 1018.—Distribution of *Leptochloa fascicularis.*

10. Leptochloa scábra Nees. (Fig. 1022.) Annual; culms erect, about 1 m tall, somewhat robust and succulent, sparingly branching; sheaths and blades scabrous, the blades elongate, 8 to 12 mm wide; panicle 20 to 40 cm long, not more than 7 cm wide, usually less, the slender racemes crowded, 4 to 8 cm long, ascending or somewhat drooping, usually curved or flexuous; spikelets crowded, mostly 3-flowered, about 3 mm long; lemmas acute, awnless, the nerves pubescent. ⊙ —Marshes and ditches, Louisiana (near New Orleans) and tropical America.

FIGURE 1019.—*Leptochloa uninervia.* Panicle, × 1; two views of floret, × 10. (Tharp 3123, Tex.)

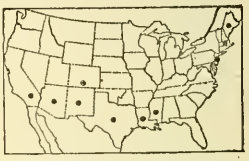

FIGURE 1020.—Distribution of *Leptochloa uninervia.*

11. Leptochloa panicoídes (Presl) Hitchc. (Fig. 1023.) Annual; culms erect or spreading, 50 to 100 cm tall, branching; sheaths glabrous; blades thin, 5 to 10 mm wide, scaberulous; panicle oblong, 10 to 20 cm long, 3 to 5 cm wide, the racemes approximate, 3 to 5 cm long, ascending, rather lax; spikelets 5- to 7-flowered, 4 to 5 mm long; lemmas 2.5 mm long, apiculate, the lateral nerves minutely pubescent at base. ⊙ (*L. floribunda* Doell.)—Indiana (Posey County), Mississippi (Holmes County), Louisiana, Texas; Brazil (fig. 1024).

FIGURE 1021.—*Leptochloa nealleyi.* Panicle, × 1; two views of floret, × 10. (Fisher 25, Tex.)

FIGURE 1022.—*Leptochloa scabra.* Panicle, × 1; two views of floret, × 10. (Tracy 8388, La.)

91. TRICHONEÚRA Anderss.

Spikelets few-flowered, the rachilla disarticulating above the glumes, the internodes pilose at base, disarticulating near their summit, the upper part forming a short callus below the floret; glumes about

equal, 1-nerved, long-acuminate, mostly as long as the spikelet or longer; lemmas bidentate, 3-nerved, the lateral nerves near the margin, the midnerve usually excurrent as a short awn, the margins long-ciliate; palea broad, the nerves near the margin. Annuals or perennials with simple panicles, the spikelets short-pediceled along one side of the main branches. Type species, *Trichoneura hookeri* Anderss. Name from Greek *thrix*, hair, and *neuron*, nerve, alluding to the ciliate nerves of the lemma.

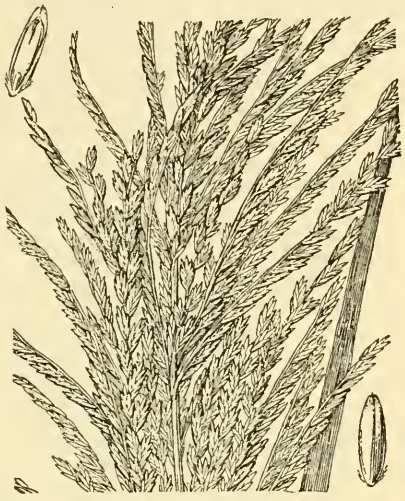

FIGURE 1023.—*Leptochloa panicoides*. Panicle, × 1. two views of floret, × 10. (Tracy 7451, Miss.)

1. Trichoneura élegans Swallen. (Fig. 1025.) Annual, branching at base; culms erect, rather robust, or ascending, 40 to 110 cm tall, several-noded; sheaths scaberulous; blades flat, or subinvolute toward the tip, scabrous, elongate, 3 to 7 mm wide; panicle erect, 10 to 18 cm long, the axis angled, scabrous; branches numerous, stiffly ascending, the lower 5 to 8 cm long, rather densely flowered; spikelets mostly 5- to 8-flowered, 9 to 10 mm long; glumes about equaling the spikelet, the setaceous tips slightly spreading; lemmas scaberulous toward the obtuse minutely lobed summit, the awn minute, the margins conspicuously ciliate on the lower half to two-thirds, the hairs as much as 1 mm long. ⊙ —Sandy soil, southern Texas.

92. TRIPÓGON Roth

Spikelets several-flowered, subsessile, appressed in two rows along one side of a slender rachis, the rachilla disarticulating above the glumes and between the florets; glumes somewhat unequal, acute or acuminate, narrow, 1-nerved; lemmas narrow, 3-nerved, bearing at base a tuft of long hairs, the apex bifid, the midnerve extending as a short awn. Our species a low, tufted perennial, with capillary blades and slender solitary spikes, the spikelets somewhat distant. Type species, *Tripogon bromoides* Roth. Name from Greek *treis*, three, and *pogon*, beard, alluding to the hairs at the base of the three nerves of the lemma.

FIGURE 1024.—Distribution of *Leptochloa panicoides*.

1. Tripogon spicátus (Nees) Ekman. (Fig. 1026.) Culms 10 to 20 cm tall; spike from one-fourth to half the entire height of the plant; spikelets 5 to 8 mm long. 2l —Rocky hills, central Texas, Mexico; Cuba; South America.

FIGURE 1025.—*Trichoneura elegans*. Plant, × 1; spikelet and floret, × 10. (Type.)

93. ELEUSÍNE Gaertn.

Spikelets few to several-flowered, compressed, sessile and closely imbricate, in two rows along one side of a rather broad rachis, not prolonged beyond the spikelets; rachilla disarticulating above the glumes and between the florets; glumes unequal, rather broad, acute, 1-nerved, shorter than the first lemma; lemmas acute, with 3 strong

FIGURE 1026.—*Tripogon spicatus*. Plant, × ½; spikelet and floret, × 5. (Nealley 78, Tex.)

green nerves close together forming a keel, the uppermost somewhat reduced; seed dark brown, roughened by fine ridges, loosely enclosed in the thin pericarp. Annuals, with two to several rather stout spikes, digitate at the summit of the culms, sometimes with one or two a short distance below, or rarely with a single spike. Type species, *Eleusine coracana*. Name from Eleusis, the town where Demeter was worshipped.

FIGURE 1027.—*Eleusine indica*. Plant, × ½; spikelet, floret, and seed (without pericarp), × 5. (Fredholm 5331, Fla.)

1. Eleusine índica (L.) Gaertn. GOOSEGRASS. (Fig. 1027.) Branching at base, ascending to prostrate, very smooth; culms compressed, usually less than 50 cm long, but sometimes as much as 1 m; blades flat or folded, 3 to 8 mm wide; spikes mostly 2 to 6, rarely more, or but 1 in depauperate plants, flat, 4 to 15 cm long. ⊙ —Waste places, fields, and open ground, Massachusetts to South Dakota and Kansas, south to Florida and Texas; occasional in Oregon and California (fig. 1028); introduced; a common weed in the warmer regions of both hemispheres.

Eleusine tristáchya Lam. Spikes 1 to 3, rarely more, 1 to 2.5 cm long, 8 to 10 mm thick; resembling *E. indica*, but the spikes short and thick. ⊙ —On ballast, Camden, N.J. and Mobile, Ala.; Portland, Oreg. and elsewhere; tropical Africa; introduced in tropical South America.

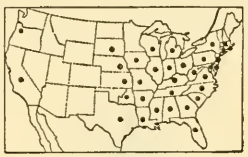

FIGURE 1028.—Distribution of *Eleusine indica*.

Eleusine coracána (L.) Gaertn. AFRICAN MILLET. More robust than *E. indica;* spikes thicker, heavier, sometimes incurved at the tip, brownish at maturity. A cultivated form of *E. indica;* the seed used for food among primitive peoples in Africa and southern Asia. ⊙ —Occasionally grown at experiment stations. Called also ragi, coracan millet, and finger millet.

94. DACTYLOCTÉNIUM Willd.

Spikelets 3- to 5-flowered, compressed, sessile and closely imbricate, in two rows along one side of the rather narrow flat rachis, the end projecting in a point beyond the spikelets; rachilla disarticulating above the first glume and between the florets; glumes somewhat unequal, broad, 1-nerved, the first persistent upon the rachis, the second mucronate or short-awned below the tip, deciduous; lemmas firm, broad, keeled, acuminate or short-awned, 3-nerved, the lateral nerves indistinct, the upper floret reduced; palea about as long as the lemma; seed subglobose, ridged or wrinkled, enclosed in a thin, early-disappearing pericarp. Annuals or perennials with flat blades and two to several short thick spikes, digitate and widely spreading at the summit of the culms. Type species, *Dactyloctenium aegyptium.* Name from Greek *daktulos,* finger, and *ktenion,* a little comb, alluding to the pectinate arrangement of the spikelets.

1. Dactyloctenium aegýptium (L.) Richt. (Fig. 1029.) Culms compressed, spreading with ascending ends, rooting at the nodes, branching, commonly forming radiate mats, usually 20 to 40 cm long, sometimes as much as 1 m; blades flat, ciliate; spikes 1 to 5 cm long. ⊙ —Open ground, waste places, and fields, Coastal Plain, North Carolina to Florida and Arizona, also occasional at more northern points (Maine to New Jersey; Illinois); tropical America (fig. 1030); introduced from tropical regions of the Old World.

95. CÝNODON Rich.

(*Capriola* Adans.)

Spikelets 1-flowered, awnless, sessile in two rows along one side of a slender continuous rachis and appressed to it, the rachilla disarticulating above the glumes and prolonged behind the palea as a

FIGURE 1029.—*Dactyloctenium aegyptium.* Plant, × ½; spikelet, floret, and seed (without pericarp), × 5. (Small and Heller 378, N.C.)

slender naked bristle, sometimes bearing a rudimentary lemma; glumes narrow, acuminate, 1-nerved, about equal, shorter than the floret; lemma firm, strongly compressed, pubescent on the keel, 3-nerved, the lateral nerves close to the margins. Perennial, usually low grasses, with creeping stolons or rhizomes, short blades, and several slender spikes digitate at the summit of the upright culms. Type species, *Cynodon dactylon*. Name from *kuon* (*kun-*), dog, and *odous*, tooth, alluding to the sharp hard scales of the rhizome.

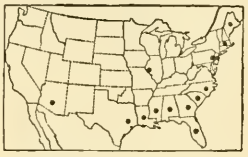

FIGURE 1030.—Distribution of *Dactyloctenium aegyptium*.

1. Cynodon dáctylon (L.) Pers. BERMUDA GRASS. (Fig. 1031.) Extensively creeping by scaly rhizomes or by strong flat stolons, the

FIGURE 1031.—*Cynodon dactylon*. Plant, × ½; spikelet and two views of floret, × 5. (Kearney, Tenn.)

old bladeless sheaths of the stolon and the lowest one of the branches often forming conspicuous pairs of "dog's teeth"; flowering culms flattened, usually erect or ascending, 10 to 40 cm tall; ligule a con-

spicuous ring of white hairs; blades flat, those of the innovations often conspicuously distichous; spikes usually 4 or 5, 2.5 to 5 cm long; spikelets imbricate, 2 mm long, the lemma boat-shaped, acute. 2↓ (*Capriola dactylon* Kuntze.)—Open ground, grassland, fields, and waste places, common, Maryland to Oklahoma, south to Florida and Texas, west to California; also occasional north of this region (New Hampshire to Michigan, Oregon) (fig. 1032); warm regions of both hemispheres, introduced in America. Bermuda grass is the most important pasture grass of the Southern States, and is also widely utilized there as a lawngrass. On alluvial ground it may grow sufficiently rank to be cut for hay. It propagates readily by its rhizomes and stolons, and on this account may become a troublesome weed in cultivated fields. This grass is known also as wire-grass (especially the weedy form in fields). A more robust form, found along the seacoast of Florida, has been called *C. maritimus*, though the type of that (from Peru) is characteristic *C. dactylon*. There are large areas of Bermuda grass around the Roosevelt Dam, Ariz., where it survives submergence and furnishes grazing at low water.

FIGURE 1032.—Distribution of *Cynodon dactylon*.

96. WILLKÓMMIA Hack.

Spikelets 1-flowered, dorsally compressed, sessile in two rows on one side of a slender rachis and appressed to it, the rachilla somewhat lengthened below and above the second glume, disarticulating just above it, not prolonged above the floret; glumes thin, unequal, the first narrow, nerveless, the second 1-nerved; lemma awnless, 3-nerved, the lateral nerves near the margin, the back of the lemma sparingly pubescent between the nerves, the margins densely covered with silky hairs; nerves of the palea densely silky hairy. Annuals or perennials, with several short spikes racemose on a slender axis; our species a low tufted perennial. Type species, *Willkommia sarmentosa* Hack. Named for H. M. Willkomm.

1. Willkommia texána Hitchc. (Fig. 1033.) Culms erect to spreading, 20 to 40 cm tall; blades flat or more or less involute, short; spikes few to several, 2 to 5 cm long, somewhat overlapping or the lower distant, appressed, the axis 4 to 15 cm long; spikelets about 4 mm long, narrow, acute; first glume about two-thirds as long as the second, obtuse; second glume subacute; lemma about as long as the second glume. 2↓ —Spots of "hard pan", central and southern Texas. A stoloniferous form has been found in Argentina.

97. SCHEDONNÁRDUS Steud.

Spikelets 1-flowered, sessile and somewhat distant in two rows on one side of a slender, continuous 3-angled rachis, appressed to its slightly concave sides, the rachilla disarticulating above the glumes, not prolonged; glumes narrow, stiff, somewhat unequal, acuminate, 1-nerved; lemmas narrow, acuminate, a little longer than the glumes, 3-nerved. Low, tufted perennial, with stiff, slender, divergent spikes arranged rather remotely along a common axis. Type species, *Schedonnardus texanus* Steud. (*S. paniculatus*). Name from Greek *schedon*, near, and *Nardus*, a genus of grasses (Steudel places *Schedonnardus* next to *Nardus* in his classification).

FIGURE 1033.—*Wilkommia texana*. Plant, × ½; two views of spikelet and floret, × 5. (Tracy 8903, Tex.)

FIGURE 1034.—*Schedonnardus paniculatus.* Plant, × ½; spikelet and floret, × 5. (Hall 797, Tex.)

1. Schedonnardus paniculátus (Nutt.) Trel. TUMBLEGRASS. (Fig. 1034.) Culms 20 to 40 cm tall; leaves crowded at the base; blades flat, mostly 2 to 5 cm long, about 1 mm wide, wavy; spikes 2 to 10 cm long; spikelets narrow, acuminate, about 4 mm long. The axis of the inflorescence elongates after flowering, becoming 30 to 60 cm long, curved in a loose spiral; the whole breaks away at maturity and rolls before the wind as a tumbleweed. ♃ —Prairies and plains, Illinois to Saskatchewan and Montana, south to Texas and Arizona; Argentina (fig. 1035). This species forms an inconsiderable part of the forage on the Great Plains.

FIGURE 1035.—Distribution of *Schedonnardus paniculatus*.

98. BECKMÁNNIA Host. SLOUGHGRASS

Spikelets 1- or 2-flowered, laterally compressed, subcircular, nearly sessile and closely imbricate, in two rows along one side of a slender continuous rachis, disarticulating below the glumes, falling entire; glumes equal, inflated, obovate, 3-nerved, rounded above but the apex apiculate; lemma narrow, 5-nerved, acuminate, about as long as the glumes; palea nearly as long as the lemma. Erect, rather stout annuals with flat blades and numerous short appressed or ascending spikes in a narrow more or less interrupted panicle. Type species, *Beckmannia erucaeformis* (L.) Host, to which our species was formerly referred. Named for Johann Beckmann.

1. Beckmannia syzigáchne (Steud.) Fernald. AMERICAN SLOUGHGRASS. (Fig. 1036.) Light green; culms 30 to 100 cm tall; panicle 10 to 25 cm long, the erect branches 1 to 5 cm long; spikes crowded, 1 to 2 cm long; spikelets 1-flowered, 3 mm long; glumes transversely wrinkled and with a deep keel, the acuminate apex of the lemma protruding. ⊙ —Marshes and ditches, Manitoba to Alaska, south to Illinois, Kansas, New Mexico, and California; New York, Ohio (fig. 1037); Asia. The European *B. erucaeformis* (L.) Host has 2-flowered spikelets. Our species is palatable to stock, sometimes sufficiently abundant locally to be an important forage grass, and is not infrequently cut for hay.

99. SPARTÍNA Schreb. CORDGRASS

Spikelets 1-flowered, much flattened laterally, sessile and usually closely imbricate on one side of a continuous rachis, disarticulating below the glumes, the rachilla not produced beyond the floret; glumes keeled, 1-nerved, acute or short-awned, the first shorter, the second often exceeding the lemma; lemma firm, keeled, the lateral nerves obscure, narrowed to a rather obtuse point; palea 2-nerved, keeled and flattened, the keel between or at one side of the nerves. Erect, often stout tall perennials, with usually extensively creeping, firm, scaly rhizomes (wanting in *Spartina spartinae*, *S. bakeri*, and sometimes in *S. patens* var. *caespitosa*), long tough blades, and two to many appressed or sometimes spreading spikes racemose on the main axis, the slender tips of the rachises naked, often prolonged. Type species, *Spartina schreberi* Gmel. Name from Greek *spartine*, a cord made from *spartes* (*Spartium junceum*), probably applied to *Spartina* because of the tough leaves.

FIGURE 1036.—*Beckmannia syzigachne.* Plant, × ½; spikelet and floret, × 5. (Hitchcock 4668, Alaska.)

The species with rhizomes often form extensive colonies to the exclusion of other plants. They are important soil binders and soil builders in coastal and interior marshes. A European species, *S. townsendi* H. and J. Groves, has in recent years assumed much importance, especially in southern England, the Netherlands, and northern France, as a soil builder along the coast where it is reclaiming extensive areas of marsh land. The marsh hay of the Atlantic coast, much used for packing and formerly for bedding, often consists largely of *S. patens*.

FIGURE 1037.—Distribution of *Beckmannia syzigachne*.

Blades usually more than 5 mm wide, flat when fresh, at least at base, the tip involute; plants mostly robust and more than 1 m tall.
- First glume as long as the floret, slender-acuminate, the second with an awn as much as 7 mm long; spikes somewhat distant, mostly more or less spreading ..... 1. S. PECTINATA.
- First glume shorter than the floret, acute, the second acute or mucronate but not slender-awned; spikes approximate, usually appressed.
  - Blades very scabrous on the margins; glumes strongly hispid-scabrous on the keels ..... 2. S. CYNOSUROIDES.
  - Blades glabrous throughout or minutely scabrous on the margins; glumes glabrous or usually softly hispidulous or ciliate on the keels.
    - Inflorescence dense and spikelike, the spikes closely imbricate; the spikelets mostly somewhat curved, giving a slightly twisted effect; blades mostly comparatively short ..... 3. S. LEIANTHA.
    - Inflorescence less dense, the spikes more slender, less crowded, the spikelets not curved, the inflorescence with no suggestion of a twist. 4. S. ALTERNIFLORA.

Blades less than 5 mm wide (rarely more in *S. gracilis*); involute (sometimes flat in *S. gracilis*); plants mostly slender and less than 1 m tall (taller in *S. bakeri*).
- Inflorescence dense, cylindric; spikes numerous ..... 5. S. SPARTINAE.
- Inflorescence not cylindric; spikes not more than 10, usually fewer.
  - Creeping rhizomes absent (see also *S. patens* var. *caespitosa*); plants in large hard tufts with tall culms (1.5 to 2 m) and long slender blades. 6. S. BAKERI.
  - Creeping rhizomes present (except in *S. patens* var. *caespitosa*); plants usually less than 1 m tall.
    - Spikelets crowded, the spikes mostly thick, erect; Western States. 7. S. GRACILIS.
    - Spikelets less crowded, the spikes relatively slender, ascending; Atlantic seacoast ..... 8. S. PATENS.

1. Spartina pectináta Link. PRAIRIE CORDGRASS. (Fig. 1038.) Culms 1 to 2 m tall, firm or wiry; blades elongate, flat when fresh, soon involute in drying, as much as 1.5 cm wide, very scabrous on the margins; spikes mostly 10 to 20, sometimes fewer or as many as 30, mostly 4 to 8 cm long, ascending, sometimes appressed, rarely spreading, on rather slender peduncles; glumes hispid-scabrous on the keel, the first acuminate or short-awned, about as long as the floret, the second exceeding the floret, tapering into an awn as much as 7 mm long; lemma glabrous except the scabrous keel, 7 to 9 mm long, the apex with two rounded teeth; palea usually a little longer than the lemma. 2$\frac{1}{4}$ (*S. michauxiana* Hitchc.)—Fresh-water marshes, Newfoundland and Quebec to eastern Washington and Oregon, south to North Carolina, Kentucky, Illinois, Arkansas, Texas, and New Mexico; in the Eastern States extending into brackish marshes along the coast (fig. 1039).

2. Spartina cynosuroídes (L.) Roth. BIG CORDGRASS. (Fig. 1040.) Culms 1 to 3 m tall, stout, the base sometimes as much as 2 cm thick; blades flat, 1 to 2.5 cm wide, very scabrous on the margins; spikes

FIGURE 1038.—*Spartina pectinata.* Plant, × ½; spikelet and floret, × 5. (Worthern, Mass.)

numerous, ascending, approximate, often dark colored, usually more or less peduncled, mostly 3 to 8 cm long; spikelets about 12 mm long; glumes acute, hispid-scabrous on the keel, the first much shorter than the floret, the second longer than the floret, sometimes rather long-acuminate; lemma not toothed at apex; palea a little longer than the lemma. 2↓ (*S. polystachya* Beauv.)—Salt or brackish marshes along the coast, Massachusetts to Florida and Texas (fig. 1041).

FIGURE 1039.—Distribution of *Spartina pectinata*.

3. Spartina leiántha Benth. (Fig. 1042.) Culms 30 to 120 cm tall, stout, as much as 1 cm thick at base, somewhat spongy, usually rooting from the lower nodes; blades 8 to 12 mm wide at the flat base, gradually narrowed to a long involute tip, smooth throughout; inflorescence dense, spikelike, about 15 cm long; spikes numerous, approximate, closely appressed, 3 to 5 cm long; spikelets very flat, 9 to 12 mm long, occasionally longer; glumes firm, glabrous or hispid-ciliate on keel, acute, the first narrow, half to two-thirds as long as second, smooth, the second sparingly hispidulous and striate-nerved; lemma hispidulous on sides, mostly smooth on keel, shorter than the second glume; palea thin, longer than the lemma. 2↓ (*S. foliosa* Trin.)—Salt marshes along the coast from San Francisco Bay, Calif., to Baja California.

FIGURE 1040.—*Spartina cynosuroides*. Panicle, × 1; spikelet, × 5. (Boettcher 444, Va.)

4. Spartina alterniflóra Lois. SMOOTH CORDGRASS. (Fig. 1043.) Smooth throughout or the margins of the blades minutely scabrous, 0.5 to 2.5 m tall; the culms soft and spongy or succulent at base, often 1 cm or more thick; blades flat, tapering to a long involute tip, 0.5 to 1.5 cm wide; spikes appressed, 5 to 15 cm long; spikelets somewhat remote, barely overlapping or sometimes more imbricate, mostly 10 to 11 mm long; glumes glabrous or hispid on the keel, the first acute, narrow, shorter than the lemma, the second obtusish, a little

FIGURE 1041.—Distribution of *Spartina cynosuroides*.

longer than the lemma; floret sparingly pilose or glabrous. 2l — Salt marshes along the coast, often growing in the water, Quebec and Newfoundland to Florida and Texas (fig. 1044); Atlantic coast of Europe. Through the southern part of the range of the species the spikelets are often more imbricate. The imbricate form with glabrous spikelets has been differentiated as *S. alterniflora* var. *glabra* (Muhl.) Fernald; that with sparsely pilose spikelets as *S. alterniflora* var. *pilosa* (Merr.) Fernald.

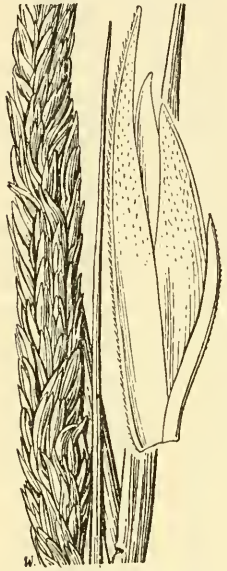

FIGURE 1042.—*Spartina leiantha*. Panicle, × 1; spikelet, × 5. (Heller 13871, Calif.)

5. Spartina spartínae (Trin.) Merr. (Fig. 1045.) In large dense tufts without rhizomes; culms stout, 1 to 2 m tall; blades narrow, firm, strongly involute; spikes short and appressed, closely imbricate, forming a dense cylindric inflorescence 10 to 30 cm long; spikelets closely imbricate, 6 to 8 mm long; glumes hispid-ciliate on the keel, the first shorter than the lemma, the second usually a little longer. 2l (*S. junciformis* Engelm. and Gray.)—Marshes, swamps, and moist prairies near the coast, Florida to Texas and eastern Mexico (fig.1046).

FIGURE 1043.—*Spartina alterniflora*. Panicle, × 1; spikelet, × 5. (Scribner 155, Maine.)

6. Spartina bakéri Merr. (Fig. 1047.) In large dense tufts without rhizomes; culms stout, 1 to 2 m tall; blades 4 to 8 mm wide, involute or occasionally flat; inflorescence 12 to 18 cm long, the spikes 5 to 12, 3 to 6 cm long, appressed; spikelets closely appressed, 6 to 8 mm long; glumes scabrous, hispid-ciliate on the keel, the first about half as long as the lemma, the second longer, acuminate. 2l — Sandy soil, South Carolina, Georgia, and Florida.

FIGURE 1044.—Distribution of *Spartina alterniflora*.

FIGURE 1045.—*Spartina spartinae*. Panicle, × 1; spikelet, × 5. (Hitchcock, Tex.)

7. Spartina grácilis Trin. ALKALI CORDGRASS. (Fig. 1048.) Culms 60 to 100 cm tall; blades flat, becoming involute, 15 to 20 cm long, very scabrous above, mostly less than 5 mm wide; spikes few, 4 to 8,

closely appressed, 1 to 1.5 cm long; spikelets 6 to 8 mm long; glumes, ciliate on the keel, acute, the first about half as long as the second; lemma nearly as long as second glume, ciliate on keel; palea as long as lemma, obtuse. 2l — Alkaline meadows and plains, Saskatchewan to British Columbia, south to Colorado and through eastern Washington to Arizona (fig. 1049).

FIGURE 1046.—Distribution of *Spartina spartinae*.

8. Spartina pátens (Ait.) Muhl. SALTMEADOW CORDGRASS. (Fig. 1050.) Culms slender, mostly less than 1 m tall, with long slender rhizomes; blades sometimes flat but mostly involute, less than 3 mm wide; spikes 2 to several, appressed to somewhat spreading, 2 to 5 cm long, rather remote on the axis; spikelets 7 to 12 mm long; first glume about half as long as the floret, the second longer than the lemma; lemma 5 to 7 mm long, emarginate at apex; palea a little longer than the lemma. 2l —Salt marshes and sandy meadows along the coast, Quebec to Florida and Texas, and in saline marshes inland, New York and Michigan (fig. 1051). The smaller, more southern form, with slightly smaller and more closely imbricate spikelets has been distinguished as *S. juncea* (Michx.) Willd. (*S. patens* var. *juncea* Hitchc.)—New Jersey to Florida. SPARTINA PATENS var. CAESPITÓSA (A. A. Eaton) Hitchc. An ambiguous form resembling *S. patens*, but growing in large tufts without rhizomes. 2l —Salt marshes, New Hampshire to New York. Larger tufted forms with rhizomes are found at Chesapeake Beach, Md., and Virginia Beach, Va.

FIGURE 1047.—*Spartina bakeri*. Panicle, ×1; spikelet, ×5. (Type.)

FIGURE 1049.—Distribution of *Spartina gracilis*.

FIGURE 1048.—*Spartina gracilis*. Panicle, × 1; spikelet, × 5. (Rydberg 2080, Mont.)

100. CTÉNIUM Panz.

(*Campulosus* Desv.)

Spikelets several-flowered but with only one perfect floret, sessile and pectinately arranged on one side of a continuous rachis, the rachilla disarticulating above the glumes; first glume small, hyaline,

1-nerved, the second about as long as the lemmas, firm, 3- to 4-nerved, bearing on the back a strong divergent awn; lemmas rather papery, 3-nerved, with long hairs on the lateral nerves and a short straight or curved awn on the back just below the apex, the first and second lemmas empty, the third enclosing a perfect flower, the upper 1 to 3 empty and successively smaller. Erect, slender, rather tall perennials, with usually solitary, often curved spikes. Type species, *Ctenium carolinianum* Panz. (*C. aromaticum*). Name from Greek *ktenion*, a little comb, alluding to the pectinate arrangement of the spikelets.

FIGURE 1050.—*Spartina patens*. Panicle, × 1; spikelet, × 5. (Killip 6359, Md.)

Plants forming dense tussocks; second glume with a row of prominent glands on each side of the midnerve; awn stout, at maturity horizontal or nearly so; ligule about 1 mm long
1. C. AROMATICUM.

Plants with slender scaly rhizomes; second glume glandless or with obscure glands; awn rather slender, not horizontally spreading; ligule 2 to 3 mm long
2. C. FLORIDANUM.

1. Ctenium aromáticum (Walt.) WOOD. TOOTHACHE GRASS. (Fig. 1052.) Culms 1 to 1.5 m tall, the old sheaths persistent and fibrillose at base; ligule about 1mm long; blades flat or involute, stiff; spike 5 to 15 cm long; spikelets 5 to 7 mm long. 2l (*Ctenium carolinianum* Panz.)—Wet pine barrens, Coastal Plain, Virginia to Florida and Louisiana (fig. 1053). The roots spicy when freshly dug. Furnishes fair cattle forage in moist pine barrens of Florida.

FIGURE 1051.—Distribution of *Spartina patens*.

2. Ctenium floridánum (Hitchc.) Hitchc. (Fig. 1054.) Differs from *C. aromaticum* in having creeping scaly rhizomes, ligule 2 to 3 mm long, second glumes with longer, more slender awns and without glands or with only obscure ones. 2l (Erroneously referred by American authors to *Campulosus chapadensis* Trin.)—Moist pine barrens, Florida.

FIGURE 1052.—*Ctenium aromaticum*. Plant, × ½; spikelet and fertile floret, × 5. (McCarthy, N.C.)

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101. GYMNOPÓGON Beauv.

Spikelets 1- or rarely 2- or 3-flowered, nearly sessile, appressed and usually remote in two rows along one side of a slender continuous rachis, the rachilla disarticulating above the glumes and prolonged behind the one or more fertile florets as a slender stipe, bearing a rudiment of a floret, this sometimes with 1 or 2 slender awns; glumes narrow, acuminate, 1-nerved, usually longer than the floret; lemmas narrow, 3-nerved, the lateral nerves near the margin, the apex minutely bifid, bearing between the teeth a slender awn, rarely awnless. Perennials or rarely annuals (ours perennial), with short, stiff, flat blades, often folded in drying, numerous long slender divergent or reflexed spikes, approximate on a slender stiff axis. Type species, *Gymnopogon racemosus* Beauv. (*G. ambiguus*). Name from Greek *gumnos*, naked, and *pogon*, beard, alluding to the naked prolongation of the rachilla.

FIGURE 1053.—Distribution of *Ctenium aromaticum*.

Awn longer than the lemma
1. G. AMBIGUUS.

Awn shorter than the lemma or none.
Spikes subcapillary, naked for 1 to several cm at base; spikelets 1-flowered.
2. G. BREVIFOLIUS.
Spikes stouter, floriferous from base; spikelets 2- or 3-flowered, the rachilla zigzag
3. G. CHAPMANIANUS.

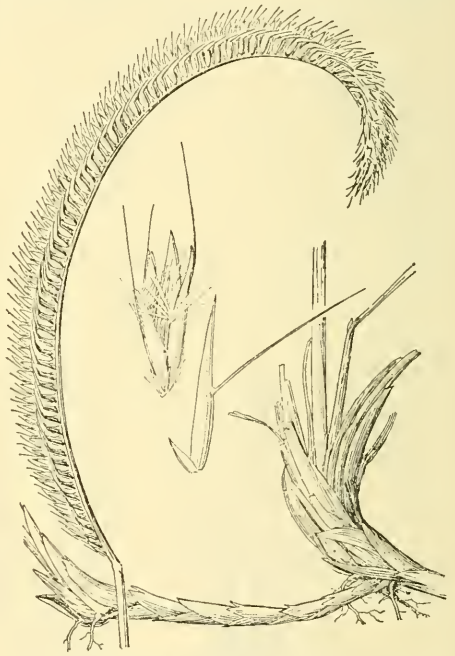

FIGURE 1054.—*Ctenium floridanum*. Plant, × 1; glumes and florets, × 5. (Combs 702a, Fla.)

1. Gymnopogon ambíguus (Michx.) B. S. P. (Fig. 1055.) Culms 30 to 60 cm tall in small clumps with short scaly rhizomes, suberect to spreading, rigid, sparingly branching; leaves numerous, approximate with overlapping sheaths, or the lower rather distant; blades spreading, 5 to 15 mm, mostly about 10 mm wide, the base rounded-truncate; spikes 10 to 20 cm long, floriferous from base, the lower spikelets often remote; glumes 4 to 6 mm long; lemma with an awn 4 to 6 mm long, the rudiment bearing a delicate shorter awn. 2♃ —Dry pinelands, Coastal Plain, New Jersey to Florida and Texas; dry woods, Tennessee to Kansas and south (fig. 1056).

2. Gymnopogon brevifólius Trin. (Fig. 1057.) Differing from *G. ambiguus* in the longer, more slender, somewhat straggling culms,

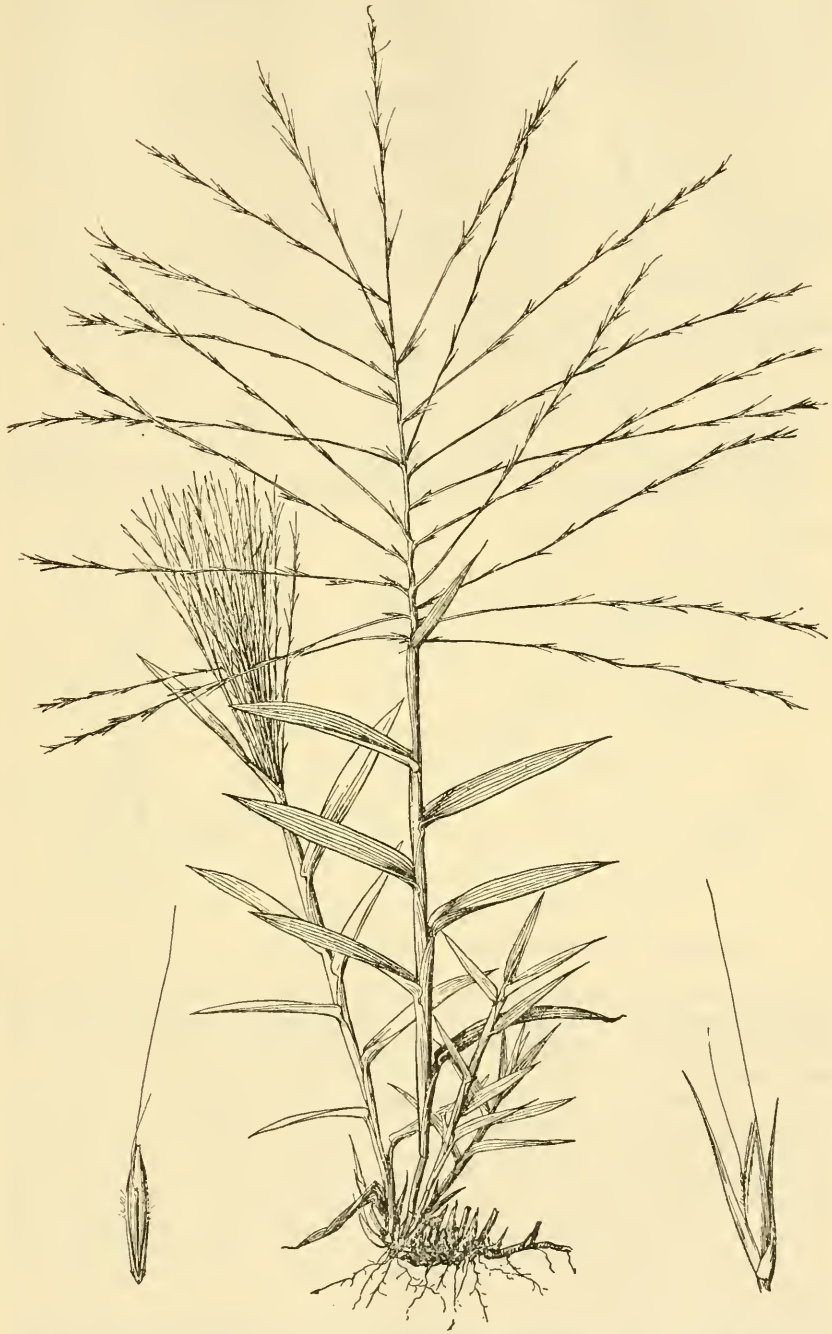

FIGURE 1055.—*Gymnopogon ambiguus*. Plant, × ½; spikelet and floret, × 5. (Tracy 8292, Tex.)

narrower, less crowded blades, and in the subcapillary spikes, floriferous only on the upper half or third; lemma awnless or with a minute awn. 2↓ —Dry ground, Coastal Plain, New Jersey to Florida and Louisiana (fig. 1058).

FIGURE 1056.—Distribution of *Gymnopogon ambiguus*.

3. Gymnopogon chapmaniánus Hitchc. (Fig. 1059.) Culms 30 to 40 cm tall, in small tufts, ascending, sparingly branching from lower nodes, rigid; leaves approximate toward the base, the blades 5 to 6 cm long, about 5 mm wide, sharp-pointed, often subinvolute in drying; spikes ascending to spreading (not reflexed), floriferous from base, spikelets not remote, 2- or 3-flowered, the florets somewhat spreading; lemmas pubescent, with a minute awn or awnless; palea very narrow, arched. 2↓ —Sandy pinelands, Florida.

102. CHLÓRIS Swartz. FINGERGRASS

Spikelets with 1 perfect floret, sessile, in two rows along one side of a continuous rachis, the rachilla disarticulating above the glumes,

FIGURE 1057.—*Gymnopogon brevifolius*. Plant, × 1; floret, × 5. (Chase 3669, Va.)

produced beyond the perfect floret and bearing 1 to several reduced florets consisting of empty lemmas, these often truncate, and, if more than one, the smaller ones usually enclosed in the lower, forming a somewhat club-shaped rudiment; glumes somewhat unequal, the first shorter, narrow, acute; lemma keeled, usually broad, 1- to 5-nerved, often villous on the callus and villous or long-ciliate on the keel or marginal nerves, awned from between the short teeth of a bifid apex, the awn slender or sometimes reduced to a mucro, the sterile lemmas awned or awnless. Tufted perennials or sometimes annuals with flat or folded scabrous blades and two to several sometimes showy and feathery spikes aggregate at the summit of the culms. Type species, *Chloris cruciata* (L.) Swartz. Named for Greek *Chloris*, the goddess of flowers.

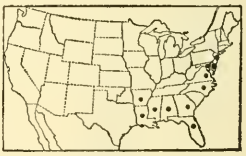

FIGURE 1058.—Distribution of *Gymnopogon brevifolius*.

Several species are found on the plains of Texas, where they form part of the forage for grazing animals. *C. virgata* is a rather common annual weed in the Southwest especially in alfalfa fields. It may be locally abundant and then furnishes considerable forage. *C. gayana*, Rhodes grass, is cultivated in the irrigated regions of the Southwest, where it is valuable as a meadow grass. It is also used in the Hawaiian Islands on some ranches in the drier regions.

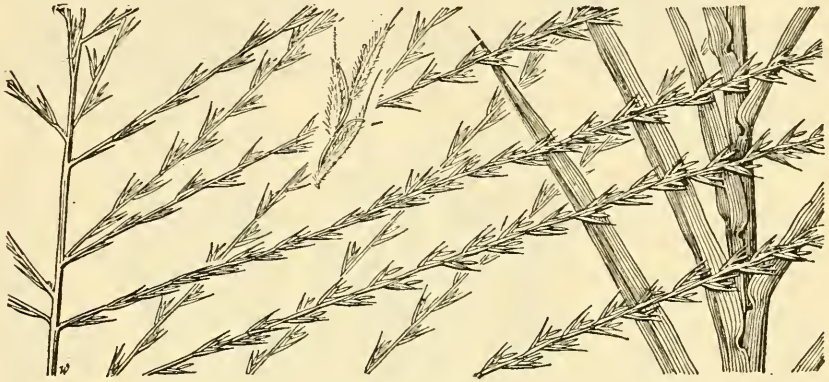

FIGURE 1059.—*Gymnopogon chapmanianus*. Plant, × 1; florets, × 5. (Tracy 7102, Fla.)

Lemmas firm, dark brown, awnless or mucronate. Perennials with strongly compressed culms and sheaths, and firm flat or folded blades abruptly rounded at the tip ..... SECTION 1. EUSTACHYS.

Lemmas distinctly awned, (awn very short in *C. cucullata*), pale or fuscous. SECTION 2. EUCHLORIS.

Section 1. Eustachys

Spikes numerous, usually more than 10 ..... 1. C. GLAUCA.

Spikes usually not more than 6.

Spikelets 2 mm long; lemmas dark ..... 2. C. PETRAEA.

Spikelets 3 mm long; lemmas pale to golden brown until maturity.

Spikes 2, sometimes 1 or 3 ..... 3. C. FLORIDANA.

Spikes 4 to 6 ..... 4. C. NEGLECTA.

Section 2. Euchloris

Rudiment narrow, oblong, acute, often inconspicuous. (Second rudiment truncate in *C. gayana*.)

Plant producing long, stout stolons ..... 5. C. GAYANA.

Plant not stoloniferous (occasionally with short stolons in *C. andropogonoides*).

Fertile lemma about 2.5 mm long; plants mostly less than 50 cm tall; spikes mostly less than 10 cm long ..... 7. C. ANDROPOGONOIDES.

Fertile lemma 4 to 7 mm long; plants 40 to 100 cm or more tall; spikes mostly more than 10 cm long.

Blades folded, abruptly acute or rounded; spikes whorled, naked at base. 8. C. TEXENSIS.

Blades flat, long-acuminate; spikes racemose on a short axis, solitary or in small fascicles ..... 6. C. CHLORIDEA.

Rudiment truncate-broadened at apex, usually conspicuous (rather narrow in *C. virgata*).

Lemma conspicuously ciliate-villous, the spikes feathery.

Plants annual. Lemma long-ciliate on the lateral nerves near apex. 9. C. VIRGATA.

Plants perennial.

Spikes flexuous, nodding, mostly 10 to 15 cm long; hairs much exceeding the spikelets ..... 10. C. POLYDACTYLA.

Spikes straight or subflexuous, 5 to 7 cm long; hairs about equaling the spikelets ..... 11. C. CILIATA.

Lemma minutely ciliate on the nerves or glabrous, the spikes not feathery.
Awn of fertile lemma usually 3 to 6 mm long; spikes mostly 7 to 12 cm long, the spikelets not closely crowded _____ 12. C. VERTICILLATA.
Awn of fertile lemma usually less than 3 mm long; spikes usually less than 6 cm long, the spikelets crowded.
Awns about 1 mm long; rudiment prominent, inflated, broadly triangular-truncate, about 1.5 mm wide as folded at summit.
15. C. CUCULLATA.
Awns 2 to 3 mm long; rudiment not inflated, not more than 1 mm wide as folded at summit.
Rudiment oblong-cuneate, about 0.6 mm wide as folded at summit.
13. C. SUBDOLICHOSTACHYA.
Rudiment triangular-truncate, about 1 mm wide as folded at summit.
14. C. LATISQUAMEA.

FIGURE 1060.—*Chloris glauca*. Plant, × 1; florets, × 5. (Combs and Baker 1143, Fla.)

SECTION 1. EÚSTACHYS (Desv.) Reichenb.

Lemmas firm, brown to blackish, awnless or mucronate only; glumes scabrous, the second mucronate from a notched or truncate summit. Perennials.

1. Chloris glaúca (Chapm.) Wood. (Fig. 1060.) Glaucous; culms erect, compressed, stout, 70 to 150 cm tall; basal sheaths several, broad, compressed, keeled, overlapping and equitant, those of the succeeding 1 or 2 distant nodes similar, 2 to 4 leaves aggregate;

blades flat or folded, as much as 1 cm wide, the tip abruptly rounded; spikes several to many (as many as 20), ascending, 7 to 12 cm long; spikelets about 2 mm long; lemma glabrous or scaberulous on the nerves. ♃ (*Eustachys glauca* Chapm.)—Brackish marshes, wet prairies, and swamps, North Carolina (Wilmington), Georgia (Baker County), and Florida.

FIGURE 1061.—*Chloris petraea*. Plant, × 1; florets, × 5. (Curtiss, Fla.)

2. Chloris petraéa Swartz. (Fig. 1061.) Often glaucous, sometimes purplish; culms slender, as much as 100 cm tall, more or less decumbent and rooting or producing distinct stolons; sheaths compressed, strongly keeled, usually 2 to 4 aggregate at the lower 1 or 2 nodes; blades 3 to 8 mm wide, often short and numerous on the stolons; spikes mostly 4 to 6, 4 to 10 cm long; spikelets 2 mm long; lemma mucronate, short-ciliate on the nerves. ♃ (*Eustachys petraea* Desv.)—Strands, sandy fields, and open pine woods, Coastal Plain, North Carolina to Florida and Texas; tropical America (fig. 1062).

FIGURE 1062.—Distribution of *Chloris petraea*.

3. Chloris floridána (Chapm.) Wood. (Fig. 1063.) Culms slender, 40 to 80 cm tall; sheaths compressed, crowded at base but not paired or aggregate at succeeding nodes; blades 3 to 7 mm wide, somewhat narrowed toward the acutish tip; spikes mostly 2, sometimes 1 or 3, 5 to 10 cm long; spikelets 3 mm long; second glume with an awn about 1 mm long; lemma with a slender mucro 0.5 to 1 mm long, stiffly ciliate on keel and lateral nerves. ♃ (*Eustachys floridana* Chapm.)—Dry sandy woods and open ground, Georgia and Florida.

4. Chloris neglécta Nash. (Fig. 1064.) Differing from *C. floridana* in having usually taller, stouter culms, the leaves sometimes paired at the lower nodes; spikes 3 to 8, mostly 4 to 6. ♃ (*Eustachys neglecta* Nash.)—Open sandy woods and swamps, Florida.

Chloris distichophýlla Lag. Culms about 1 m tall; spikes several (as many as 20), drooping, feathery; lemma ciliate with silky hairs 1 mm long. ♃ —Escaped from cultivation in southern California. A specimen from Bastrop, Tex., is probably also an escape from cultivation; South America.

FIGURE 1063.—*Chloris floridana*. Panicle, × 1; florets, × 5. (Nash 2198, Fla.)

SECTION 2. EUCHLÓRIS Endl.

Lemmas tawny to grayish or fuscous, awned; glumes acute to acuminate. Mostly perennial.

5. Chloris gayána Kunth. RHODES GRASS. (Fig. 1065.) Culms 1 to 1.5 m tall with long, stout, leafy stolons, the internodes compressed, tough and wiry; blades 3 to 5 mm wide, tapering to a fine point; spikes several to numerous, erect or ascending, 5 to 10 cm long; spikelets crowded, pale-tawny; lemma 3 mm long, hispid on the margin near the summit, more or less hispidulous below, the awn 1 to 5 mm long; rudiment commonly of 2 florets, the lower rather narrow, the awn usually somewhat shorter than that of the fertile lemma, the upper minute, broad, truncate. ♃ —Cultivated for forage in warmer regions, escaped into fields and waste places, North Carolina and from Florida to southern California and in tropical America (fig. 1066); introduced from Africa. A promising meadow grass in irrigated regions.

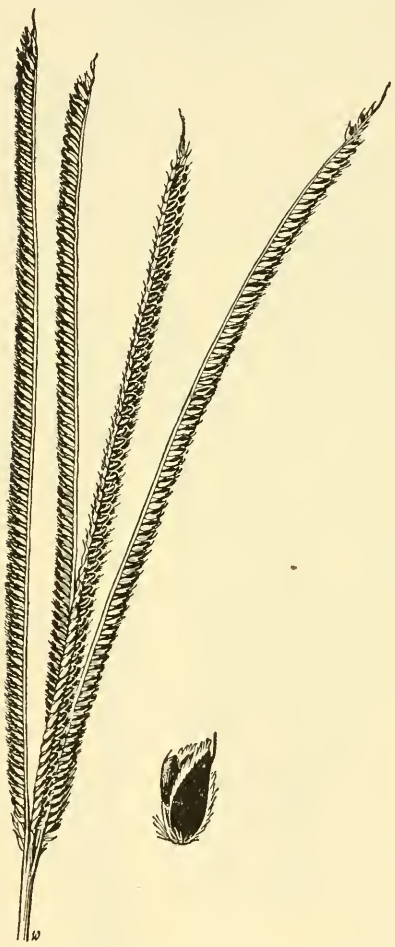

FIGURE 1064.—*Chloris neglecta.* Panicle, × 1; florets, × 5. (Curtiss 3445, Fla.)

6. Chloris chlorídea (Presl) Hitchc. (Fig. 1067.) Culms slender, 60 to 100 cm tall; blades flat, 3 to 7 mm wide, long-acuminate; spikes slender, few to several, mostly 8 to 15 cm long, approximate on an axis 2 to 10 cm long; spikelets appressed, not crowded; lemma narrow, glabrous, somewhat scaberulous toward the tip, about 6 mm long, the awn 10 to 12 mm long; rudiment very narrow, awned. ♃ (*C. clandestina* Scribn. and Merr.)—Open ground, Texas (Brownsville) and Mexico. Large cleistogamous spikelets are borne on slender underground branches, rather rare in herbarium specimens, either infrequent or readily broken off.

7. Chloris andropogonoídes Fourn. (Fig. 1068.) Culms densely tufted, 20 to 40 cm tall, the leaves mostly basal; blades about 1 mm wide as folded; spikes slender, few to several, 5 to 10 cm long, whorled, divergent, floriferous from base; spikelets scarcely overlapping; lemma minutely pubescent on midnerve and margin or glabrous, 2 to 3 mm usually about 2.5 mm long, awned below the tip, the awn about 5 mm long; rudiment narrow, the awn usually shorter than that of the lemma. ♃ (*C. tenuispica* Nash.)—Plains, Texas and northern Mexico.

8. Chloris texénsis Nash. (Fig. 1069.) Culms taller and stouter than in *C. andropogonoides;* blades 2 to 3 mm wide as folded; spikes

FIGURE 1065.—*Chloris gayana*. Plant, × ½; florets, × 5. (Hitchcock 13667, Ariz.)

slender, mostly about 15 to 18 cm long, naked for 1 to 4 cm at the base; spikelets appressed, not crowded; lemma about 4 mm long, naked on the midnerve, minutely pilose on margin toward summit; awn about 1 cm long. ♃ (*C. nealleyi* Nash.)—Plains, Texas, rare.

Chloris prieúrii Kunth. Annual; culms 30 to 60 cm tall, often rooting at the lower nodes; blades 2 to 6 mm wide, the upper sheath inflated; spikes 2 to 8, erect, 5 to 8 cm long; fertile lemma 2.5 mm long, narrow, ciliate near the summit, with a delicate awn 7 to 10 mm long; rudiment narrow, of 3 or 4 reduced sterile lemmas each with a long delicate erect awn. ⊙ —Ballast, Wilmington, N. C., and Mobile, Ala.; West Africa.

FIGURE 1066.—Distribution of *Chloris gayana.*

9. Chloris virgáta Swartz. FEATHER FINGERGRASS. (Fig. 1070.) Annual; culms ascending to spreading, 40 to 60 or even 100 cm tall; upper sheaths often inflated; blades flat, 2 to 6 mm wide; spikes several, 2 to 8 cm long, erect, whitish or tawny, feathery or silky; spikelets crowded; lemma 3 mm long, somewhat humpbacked on the keel, long-ciliate on the margins near the apex, the slender awn 5 to 10 mm long; rudiment narrowly cuneate, truncate, the awn as long as that of the

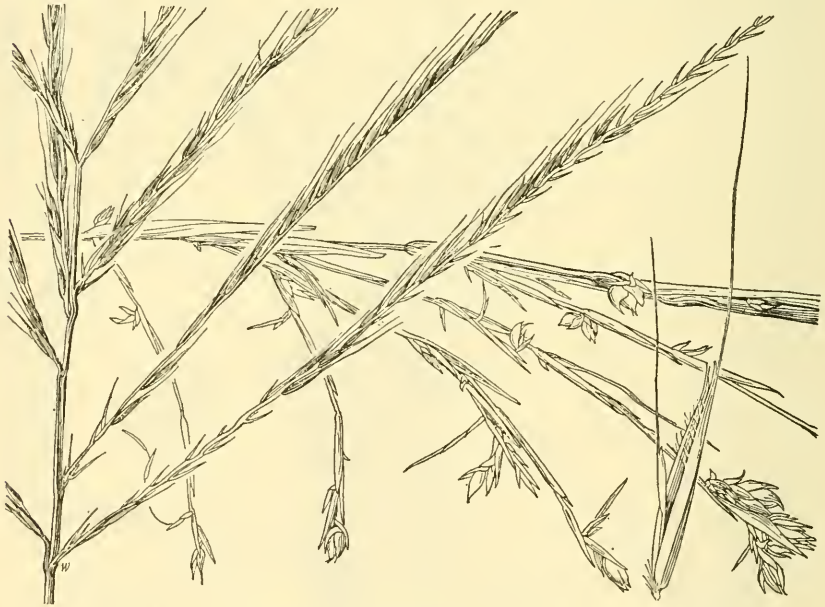

FIGURE 1067.—*Chloris chloridea.* Inflorescences, × 1; florets, × 5. (Silveus 379, Tex.)

lemma. ⊙ (*C. elegans* H.B.K.)—Open ground, a common weed in fields and waste places; Nebraska to Texas and southern California; Maine and Massachusetts, on wool waste; introduced in a few localities in the Eastern States (North Carolina, South Carolina, Missouri); tropical America (fig. 1071).

10. Chloris polydáctyla (L.) Swartz. (Fig. 1072.) Culms erect, wiry, 50 to 100 cm tall; blades as much as 1 cm wide; spikes several

to many, mostly 10 to 15 cm long, flexuous, nodding, tawny, feathery; spikelets crowded; lemma ciliate with long silky hairs; rudiment

FIGURE 1068.—*Chloris andropogonoides.* Panicle × 1; florets, × 5. (Chase 6067, Tex.)

oblong, obliquely truncate, awns of lemma and rudiment about 3 mm long. ♃ —Open sandy soil, southern Florida; West Indies to Paraguay.

FIGURE 1069.—*Chloris texensis.* Panicle, × 1; florets, × 5. (Thurow 8, Tex.)

11. Chloris ciliáta Swartz. (Fig. 1073.) Perennial; culms erect or ascending, 50 to 100 cm tall; leaves not aggregate toward the base, sheaths not much compressed; blades 3 to 5 mm wide, sharply

FIGURE 1070.—*Chloris virgata*. Plant, × ½; glumes and florets, × 5. (Tracy 8173, Tex.)

acuminate; spikes mostly 3 to 6, usually 5 to 7 cm long, digitate or nearly so, erect to spreading, somewhat flexuous; spikelets crowded, about 3 mm long; lemma densely long-villous on the keel and the middle of the margin, the awn shorter than the body; rudiment triangular-cuneate, about 2 mm wide. ♃ (*C. nashii* Heller.)—Open grassland, southern Texas and Mexico.

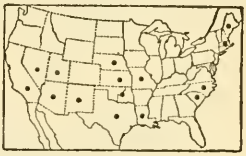

FIGURE 1071.—Distribution of *Chloris virgata.*

12. Chloris verticillàta Nutt. WINDMILL GRASS. (Fig. 1074.) Culms tufted, 10 to 40 cm tall, erect or decumbent at base, sometimes rooting at the lower nodes; leaves crowded at base, 2 to 4 sometimes aggregate at lower nodes; sheaths compressed, blades 1 to 3 mm wide, obtuse; spikes slender, 7 to 10 or even 15 cm long, in 1 to 3 whorls, finally widely spreading; spikelets about 3 mm long; fertile lemma pubescent on the nerves, the awn mostly 5 to 8 mm long; rudiment cuneate-oblong, rather turgid, about 0.7 mm wide as folded, truncate,

FIGURE 1072.—*Chloris polydactyla.* Panicle, × 1; florets, × 5. (Simpson, Fla.)

FIGURE 1073.—*Chloris ciliata.* Panicle, × 1; florets, × 5. (Tracy 8886, Tex.)

the awn about 5 mm long. ♃ —Plains, Missouri to Colorado, south to Louisiana and New Mexico; introduced in Maryland, Illinois, Indiana, and California (Berkeley) (fig. 1075). The inflorescence at maturity breaks away and rolls before the wind as a tumbleweed.

13. Chloris subdolichostáchya C. Muell. (Fig. 1076.) Similar to *C. verticillata*, but not more than 20 cm tall, spikes mostly less than 6 cm long, these more condensed and usually in one whorl or irregularly approximate; lemma 2 to 2.5 mm long, the awns mostly less than 3 mm long; rudiment oblong-cuneate, about 0.6 mm wide as folded. ♃ (*C. brevispica* Nash.)—Plains, Texas.

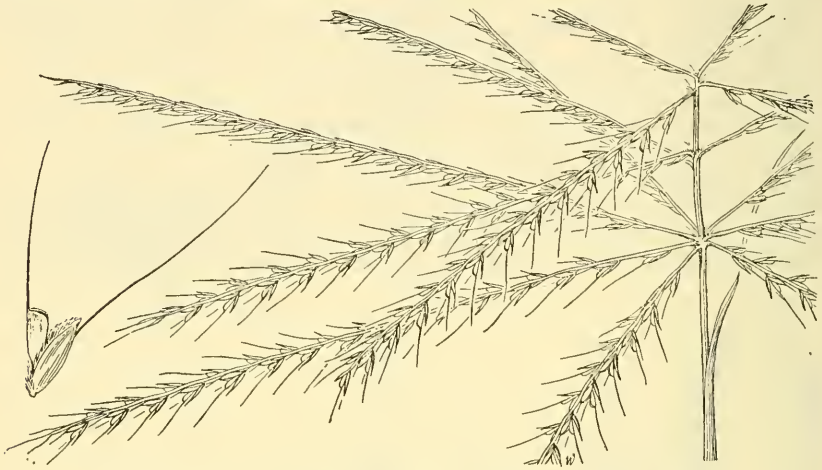

FIGURE 1074.—*Chloris verticillata*. Panicle, × 1; florets, × 5. (Ball 1112, Tex.)

14. Chloris latisquámea Nash. (Fig. 1077.) Culms densely tufted, 20 to 60 cm tall, very leafy at base, sometimes rooting at the lower nodes; sheaths compressed, 2 to 4 often aggregate at the lower node; blades 2 to 4 mm wide; spikes mostly 8 to 12, relatively broad, 4 to 10 cm long, in 1 or 2 whorls, spreading; spikelets rather crowded, pale, turning fuscous at maturity; lemma about 2.5 mm long, pubescent on the nerves, the awn 2 to 2.5 mm long; rudiment triangular cuneate, about 1 mm wide at summit as folded. ♃ —Plains, Texas, Arizona. Resembling *C. cucullata*, but commonly taller with longer spikes, the rudiment longer than broad, less inflated, the awns 2 to 2.5 mm long.

FIGURE 1075.—Distribution of *Chloris verticillata*.

FIGURE 1076.—*Chloris subdolichostachya*. Panicle, × 1; florets, × 5. (Heller 1579, Tex.)

15. Chloris cucullâta Bisch. (Fig. 1078.) Culms tufted, erect or somewhat spreading at base, 20 to 50 cm tall; sheaths compressed;

blades 1 to 2 mm wide as folded, the uppermost often much reduced; spikes numerous, 2 to 5 cm long, digitate, radiating, flexuous or curled; spikelets crowded, stramineous, turning fuscous at maturity, triangular, about 2 mm long and about as broad; rudiment prominent, compressed-cupshaped, about 1.5 mm wide, the awns of lemma and rudiment about 1 mm long. 2l —Plains and sandy barrens, Texas and New Mexico.

FIGURE 1077.—*Chloris latisquamea.* Panicle, × 1; florets, × 5. (Mearns 1233, Ariz.)

Chloris radiáta (L.) Swartz. Weedy branching annual; culms 30 to 40 cm long, decumbent; blades thin, 2 to 3 mm wide; spikes slender, several to many, 3 to 8 cm long; lemma narrow, 2.5 mm long, the narrow rudiment mostly included in its margins; awns of lemma and rudiment very slender, 5 to 10 mm long. ⊙ —Ballast, near Portland, Oreg.; tropical America.

CHLORIS TRUNCÁTA R. Br. Stoloniferous perennial; culms erect, 10 to 30 cm tall; spikes 6 to 10, 7 to 15 cm long, horizontal or reflexed; spikelets 3 mm long, the awns 6 to 12 mm long. 2l —Occasionally cultivated for ornament under the name stargrass. Australia.

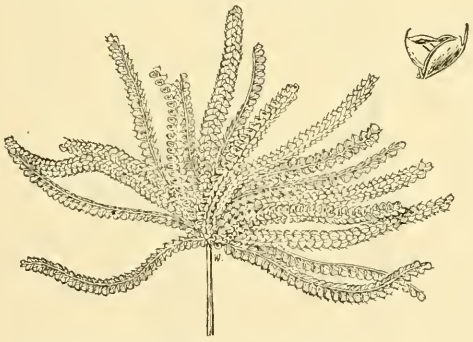

FIGURE 1078.—*Chloris cucullata.* Panicle, × 1; florets, × 5. (Hitchcock 5497, Tex.)

103. TRICHLÓRIS Fourn.

Spikelets 2- to 5-flowered, nearly sessile, in two rows along one side of a continuous slender rachis, the rachilla disarticulating above the glumes and prolonged behind the uppermost perfect floret, bearing a reduced, usually awned floret; glumes unequal, acuminate, or short-awned, the body shorter than the lower lemma; lemmas narrow, 3-nerved, the midnerve and usually the lateral nerves extending into slender awns. Erect, slender, tufted perennials, with flat scabrous blades and numerous erect or ascending spikes, aggregate but scarcely digitate at the summit of the culms. Type species, *Trichloris pluriflora.* Name from Latin *tri*, three, and *Chloris*, a genus of grasses, the lemmas being 3-awned.

Spikelets 2-flowered, both lemmas with 3 long awns ..... 1. T. MENDOCINA.
Spikelets 3- to 5-flowered, the lateral awns of the lemmas more or less reduced, sometimes obsolete ..... 2. T. PLURIFLORA.

FIGURE 1079.—*A*, *Trichloris mendocina*. Plant, × ½; glumes and florets, × 5. (Nealley, Tex.) *B*, *T. pluriflora*. Glumes and florets, × 5. (Griffiths 6484, Tex.)

1. Trichloris mendocína (Phil.) Kurtz. (Fig. 1079, *A*.) Culms 40 to 100 cm tall; blades 2 to 4 mm wide; inflorescence dense, feathery, the spikes 5 to 10 cm long; spikelets crowded; fertile lemma about 3 mm long, the second lemma much reduced, both with delicate awns about 1 cm long. 2↓ —Plains, canyons, and rocky hills, western Texas to Arizona and northern Mexico; southern South America. Rarely cultivated for ornament (as *T. blanchardiana* Fourn.).

2. Trichloris pluriflóra Fourn. (Fig. 1079, *B*.) Culms 50 to 100 cm tall; blades 5 to 10 mm wide; inflorescence looser and less feathery than in *T. mendocina;* spikes 7 to 15 cm long; fertile lemma about 4 mm long, the others successively shorter, the middle awns of all 5 to 15 mm long, somewhat spreading, the lateral awns short or obsolete. 2↓ —Plains and dry woods, southern Texas and Mexico; southern South America.

104. BOUTELÓUA Lag. Grama

Spikelets 1-flowered, with the rudiments of one or more florets above, sessile, in two rows along one side of the rachis; glumes 1-nerved, acuminate or awn-tipped, the first shorter and narrower; lemma as long as the second glume or a little longer, 3-nerved, the nerves extending into short awns or mucros, the internerves usually extending into lobes or teeth; palea sometimes 2-awned; rudiment various, usually 3-awned, the awns usually longer than those of the fertile lemma, a second rudimentary floret sometimes present. Perennial or sometimes annual, low or rather tall grasses, with two to several or many spikes racemose on a common axis, or sometimes solitary, the spikelets few to many in each spike, rarely solitary, pectinate or more loosely arranged and appressed, the rachis of the spike usually naked at the tip. The sterile florets forming the rudiment are variable in all the species and commonly in individual specimens. The general pattern of rudiment is fairly constant for each species, the variability being in the reduction or increase in number and size of the sterile florets, the reduction from 3 awns to 1, and in the amount of pubescence. Type species, *Bouteloua racemosa* Lag. (*B. curtipendula*). Named for the brothers Boutelou, Claudio, and Esteban. The genus was originally published as *Botelua*.

The many species are among our most valuable forage grasses, forming an important part of the grazing on the western ranges. *B. gracilis*, blue grama, and *B. hirsuta*, hairy grama, are prominent in "short grass" regions of the Great Plains; *B. eriopoda*, black grama, and *B. rothrockii*, Rothrock grama, are prominent in Arizona. Two annuals, *B. barbata* and *B. parryi*, form a part of the sixweeks grasses of the Southwest; *B. curtipendula* is widely distributed and is much used for grazing and for hay; *B. trifida* is important from Texas to Arizona.

Spikelets not pectinately arranged (except in *B. chondrosioides*), the spikes falling entire at maturity ..... Section 1. Atheropogon.
Spikelets pectinately arranged, the spikes persistent, the florets falling from the persistent glumes ..... Section 2. Chrondrosium.

Section 1. Atheropogon

Plants annual ..... 1. B. aristidoides.
Plants perennial.
Spikes usually 20 to 50; awns short, inconspicuous.
Spikes of 1 or 2 spikelets; culms very slender ..... 2. B. uniflora.
Spikes of few to several spikelets; culms mostly stouter. 3. B. curtipendula.

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Spikes fewer, awns conspicuous.
Glumes pubescent.
Spikes rhomboid-oblong, as much as 2 cm long, the spikelets somewhat pectinately arranged ..... 6. B. CHONDROSIOIDES.
Spikes cuneate-triangular, about 1 cm long (including the awns), the spikelets appressed, not pectinately arranged.
Culms 20 to 30 cm tall; leaves crowded at base; spikes mostly 6 to 8. 4. B. RIGIDISETA.
Culms mostly 30 to 50 cm tall, leafy throughout; spikes mostly more than 10 ..... 5. B. ELUDENS.
Glumes glabrous or scabrous, not pubescent.
Base of plants hard, rhizomatous; culms simple; spikes 2 to 3 cm long. 7. B. RADICOSA.
Base of plants not rhizomatous; culms branching; spikes usually about 1.5 cm, sometimes 2 cm, long ..... 8. B. FILIFORMIS.

Section 2. Chondrosium

Plants annual (see also *B. rothrockii*); densely tufted, spreading.
Spike 1 ..... 9. B. SIMPLEX.
Spikes 2 or more.
Rachis papillose-pilose ..... 11. B. PARRYI.
Rachis not pilose ..... 10. B. BARBATA.
Plants perennial.
Plants decumbent or stoloniferous; culms white-lanate ..... 16. B. ERIOPODA.
Plants erect or nearly so; culms not lanate, tufted.
Spikes normally 2, sometimes 1 or 3.
Rachis prolonged beyond the spikelets as a naked point; glumes tuberculate ..... 13. B. HIRSUTA.
Rachis not prolonged; glumes not tuberculate (slightly so in *B. gracilis*).
Culms herbaceous, the base not woody ..... 14. B. GRACILIS.
Culms woody and perennial at base ..... 15. B. BREVISETA.
Spikes normally 4 or more (see also *B. gracilis* var. *stricta*).
Culms 25 to 50 cm tall; awn 1 to 2 mm long; glumes scabrous; spikes spreading ..... 12. B. ROTHROCKII.
Culms 10 to 20 cm tall; awn about 5 mm long; glumes glabrous; spikes usually appressed ..... 17. B. TRIFIDA.

SECTION 1. ATHEROPÓGON (Muhl.) Endl.

Spikes deciduous from the main rachis; spikelets not pectinately arranged (somewhat so in *B. chondrosioides*). (*Atheropogon* Muhl. based on *A. apludoides* Muhl. (*Bouteloua curtipendula*).)

1. Bouteloua aristidoídes (H.B.K.) Griseb. NEEDLE GRAMA. (Fig. 1080.) Annual, erect or spreading, branching; culms slender, 10 to 30 cm tall; blades small and few, in vigorous plants as much as 15 cm long; spikes mostly 8 to 14 on a slender axis, reflexed, readily falling, the base of the rachis forming a sharp, bearded point; spikelets 2 to 4, narrow, appressed; rudiment of 3 scabrous awns about 5 mm long, exceeding the fertile floret. ⊙ (*Triathera aristidoides* Nash.)—Mesas, deserts, and foothills in open ground, Texas to southern California and northern Mexico; Argentina (fig. 1081).

2. Bouteloua uniflóra Vasey. (Fig. 1082.) Resembles slender forms of *B. curtipendula*, culms slender, wiry, sometimes with slender stolons, the slender blades subinvolute, the spikes 8 to 9 mm long, with 1 or 2 spikelets, the scabrous rachis mostly longer than the first glume; lemma awnless; rudiment reduced to a single awn appressed to the back of the palea. ♃ —Rocky hills and valleys, central and western Texas.

3. Bouteloua curtipéndula (Michx.) Torr. SIDE-OATS GRAMA. (Fig. 1083.) Perennial, with scaly rhizomes; culms erect, tufted, 50 to 80 cm tall; blades flat or subinvolute, 3 to 4 mm wide, scabrous;

spikes 35 to 50, 1 to 2 cm long, purplish, spreading or pendulous and mostly twisted to one side of the slender axis, this 15 to 25 cm long; spikelets 5 to 8, appressed or ascending, 6 to 10 mm long; fertile lemma acute, mucronate; rudiment with 3 awns and subacute inter-

FIGURE 1080.—*Bouteloua aristidoides.* Panicle, × 1; spikelet, × 5 (Griffiths 7308, Ariz.)

FIGURE 1082.—*Bouteloua uniflora*, × 10. (Type.)

mediate lobes, often reduced and inconspicuous. ♃ (*Atheropogon curtipendulus* Fourn.)—Plains, prairies, and rocky hills, Maine and Ontario to Montana, south to Maryland, Alabama, Texas, Arizona, and southern California; South Carolina (introduced) (fig. 1084).

FIGURE 1081.—Distribution of *Bouteloua aristidoides.*

4. Bouteloua rigidiséta (Steud.) Hitchc. (Fig. 1085.) Perennial, tufted, leafy at base; culms erect, 20 to 30 cm tall; blades narrow, flat or somewhat involute, 1 to 1.5 mm wide, sparingly papillose-pilose; spikes 6 to 8, triangular-cuneate, spreading, about 1 to 1.2 cm long including the awns; spikelets mostly 2 to 4, crowded, ascending; glumes pubescent; fertile lemma with 3 spreading awns, the intermediate lobes acute; rudiment with stout spreading awns, much exceeding those of the fertile lemma, the intermediate lobes firm, pointed, a second similar but smaller rudiment commonly developed. ♃ (*B. texana* S. Wats.; *Polyodon texanus* Nash.)—Plains and rocky hills, Oklahoma, Texas, and northern Mexico.

5. Bouteloua elúdens Griffiths. (Fig. 1086.) Perennial, densely tufted, leafy at base; culms erect, 25 to 60 cm tall; blades mostly

1 to 1.5 mm wide; axis slender, flexuous, 6 to 8 cm long; spikes 10 to 20, triangular, spreading, about 1 cm long including the awns; spikelets

FIGURE 1083.—*Bouteloua curtipendula.* Plant, × ½; spikelet and florets, × 5. (Chase 5408, Colo.)

about 5; rachis and glumes densely pubescent; fertile lemma pubescent toward the summit, the apex 3-cleft, the divisions awn-tipped;

rudiment with stout pubescent awns about 5 mm long, the long narrow intermediate lobes glabrous; a second similar but smaller rudiment usually developed. ♃ —Rocky hills, southern Arizona and Sonora, Mexico.

6. Bouteloua chondrosioídes (H.B.K.) Benth. (Fig. 1087.) Perennial, tufted, leafy at base; culms erect, 20 to 50 cm tall; blades 2 to 3 mm wide; axis 4 to 6 cm long; spikes 4 to 6, rhomboid-oblong, ascending, 1 to 2 cm long, the rachis densely pubescent, the tip 3-cleft; spikelets several, subpectinate; rachis broad, densely pubescent on the margin; glumes and fertile lemma densely pubescent, the lemma 3-cleft, the divisions awn-tipped; rudiment cleft nearly to the base, the middle awn broadly winged, the lateral ones slender, all spreading ♃ —Mesas and rocky hills, western Texas, southern Arizona, and Mexico.

FIGURE 1084.—Distribution of *Bouteloua curtipendula*.

7. Bouteloua radicósa (Fourn.) Griffiths. PURPLE GRAMA. (Fig. 1088.) Perennial, tufted, from a stout rhizomatous base; culms erect, 60 to 80 cm tall; blades 2 to 3 mm wide, sparsely papillose-ciliate on the margin, mostly aggregate toward the lower part of the culm, the upper part naked; axis 10 to 15 cm long; spikes mostly 7 to 12, oblong, 2 to 3 cm long; spikelets mostly 8 to glumes broader than in other species; fertile lemma indurate down the center, with 3 awns, the middle longest, and no intermediate lobes; rudiment with 3 awns 5 to 8 mm long and no intermediate lobes, usually containing a palea and staminate flower, sometimes a perfect flower, the lower floret being staminate. ♃ —Rocky hills, southern New Mexico to southern California and Mexico.

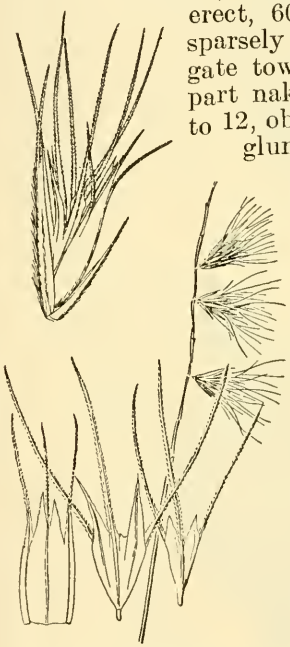

FIGURE 1085.—*Bouteloua rigidiseta*. Panicle, × 1; spikelet, lemma, and florets, × 5. (Griffiths 6370, Tex.)

8. Bouteloua filifórmis (Fourn.) Griffiths. SLENDER GRAMA. (Fig. 1089.) Resembling *B. radicosa*; culms erect or geniculate-spreading, sparingly branching, the base not rhizomatous; spikes ascending to spreading, mostly about 1.5 cm long, sometimes as much as 2 cm; spikelets mostly 6 to 10, very like those of *B. radicosa*. ♃ —Rocky hills, Texas to Arizona and Mexico.

SECTION 2. CHONDRÓSIUM (Desv.) Benth.

Spikes persistent; spikelets crowded (looser in *B. eriopoda*), pectinate; florets falling from the glumes. (*Chondrosium* Desv. based on *C. procumbens* Durand (*B. simplex*).)

9. Bouteloua símplex Lag. MAT GRAMA. (Fig. 1090.) Annual, tufted, prostrate or ascending; foliage scant; blades 2 to 3 cm long, about 1.5 mm wide; spike solitary, 1.5 to 2.5 cm long, strongly arcuate at maturity; spikelets mostly 20 to 30, about 5 mm long; fertile lemma

pilose at base with stout awns and subacute intermediate lobes; rudiment bearded at summit of rachilla-joint, cleft to the base or nearly so, the awns equal, a second rudiment, broad and awnless, sometimes developed. ⊙ (*B. procumbens* Griffiths.)—Open ground, Texas to Colorado, Utah, Arizona, and Mexico; wool waste, Maine; Ecuador to Argentina (fig. 1091).

10. Bouteloua barbâta Lag. SIXWEEKS GRAMA. (Fig. 1092.) Annual, tufted, branching, erect to prostrate, often forming mats with

FIGURE 1086.—*Bouteloua eludens*. Panicle, × 1; spike and spikelet, × 5. (Type.)

ascending ends, the culms as much as 30 cm long; foliage scant; blades 1 to 4 cm long, 1 to 1.5 mm wide; spikes 4 to 7, 1 to 2 cm long; spikelets 25 to 40, 2.5 to 4 mm long, nearly as broad; fertile lemma densely pilose at least along the sides, usually throughout, the awns from minute to as long as the body, the intermediate lobes subacute to obtuse; rudiment from obscurely to conspicuously bearded at summit

of rachilla joint, cleft nearly to the base, the intermediate lobes broad, subcucullate, the awns of rudiment and fertile lemma reaching about the same height, a second rudiment, broad and awnless, often developed ⊙ (*B. microstachya* L. H. Dewey.) —Open ground, mesas, and rocky hills, Texas, New Mexico, southern Utah, Arizona, southeastern California, Mexico (fig. 1093). The awns vary in length. The form with shorter awns is that described as *B. pumila* Buckl.; the longer awned form is that described as *B. arenosa* Vasey.

FIGURE 1087.—*Bouteloua chondrosioides.* Panicle, × 1; spikelet, × 5. (Type.)

11. Bouteloua párryi (Fourn.) Griffiths. PARRY GRAMA. (Fig. 1094.) Annual, resembling *B. rothrockii;* culms erect or geniculate-spreading, sometimes branching; blades papillose-pilose; spikes 4 to 8, often flexuous, commonly grayish purple, 2 to 3.5 cm long; rachis papillose-pilose; spikelets 40 to 65, about 6 mm long; second glume awned from a bifid tip, the keel papillose-pilose with spreading hairs; fertile lemma densely pilose, deeply cleft, the awns spreading,

FIGURE 1088.—*Bouteloua radicosa.* Panicle, × 1; spikelet, × 5. (Griffiths 7181, Ariz.)

FIGURE 1089.—*Bouteloua filiformis.* Panicle, × 1; spikelet, × 5. (Griffiths 7199, Ariz.)

the oblong intermediate lobes fimbriate; rudiment densely bearded at summit of rachilla, cleft nearly to the base, the lobes obovate, fimbriate, the awns exceeding those of the fertile lemma; a second rudi-

ment, broad, awnless or with a single awn, usually developed. ⊙ —Mesas and rocky hills, New Mexico, Arizona, and northern Mexico.

12. Bouteloua rothróckii Vasey. ROTHROCK GRAMA. (Fig. 1095.) Perennial, sometimes appearing to be annual; culms tufted, erect, 25

FIGURE 1090.—*Bouteloua simplex*. Plant, × 1; spikelet, × 5. (Griffiths 7362, Ariz.)

FIGURE 1091.—Distribution of *Bouteloua simplex*.

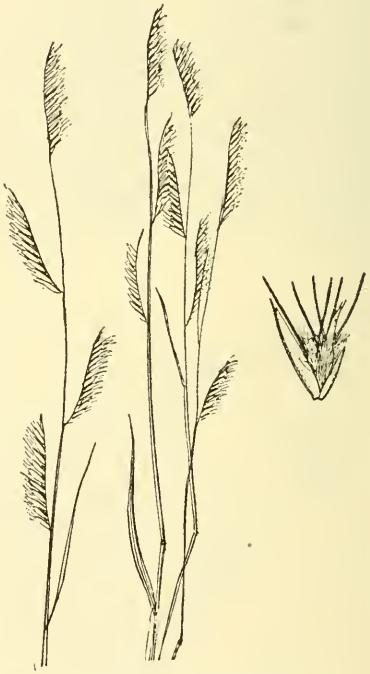

FIGURE 1092.—*Bouteloua barbata*. Plant, × 1; spikelet, × 5. (Griffiths 6095, Ariz.)

FIGURE 1093.—Distribution of *Bouteloua barbata*.

to 50 cm tall; blades 2 to 3 mm wide; axis 10 to 25 cm long; spikes 4 to 12, 2.5 to 3 cm long, straight to subarcuate; spikelets 40 to 50, about 5 mm long; fertile lemma pilose at base, deeply cleft, the awns (1 to 2 mm long) spreading, the intermediate and lateral lobes fimbriate; rudiment densely bearded at summit of rachilla joint, cleft nearly to the base, the lobes broad and rounded, the awns mostly exceeding those of the fertile lemma; a second rudiment, broad and awnless, usually developed. ♃ —Mesas, canyons, and rocky hills, in open ground, or among brush, Arizona and southern California (Jamacha), south to northern Mexico.

13. Bouteloua hirsúta Lag. HAIRY GRAMA. (Fig. 1096.) Perennial, densely tufted; culms erect, 20 to 60 cm tall, leafy at base; blades flat or subinvolute, about 2 mm wide, flexuous; spikes 1 to 4, usually 2, 2.5 to 3.5 cm long, the rachis extending beyond the spikelets as a slender point 5 to 8 mm long; spikelets 35 to 45, about 5 mm long, second glume tuberculate-hirsute with spreading hairs, the tubercles black; fertile lemma 3-cleft, the divisions and margins of lemma pubescent, awn-tipped; rudiment from puberulent to bearded at summit of

FIGURE 1094.—*Bouteloua parryi*. Panicle, × 1; spikelet, × 5. (Griffiths 7277, Ariz.)

FIGURE 1095.—*Bouteloua rothrockii*. Panicle, × 1; spikelet, × 5. (Griffiths 7185, Ariz.)

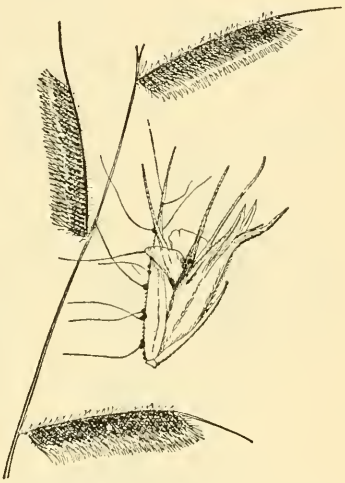

FIGURE 1096.—*Bouteloua hirsuta*. Panicle, × 1; spikelet, × 5. (Griffiths 3371, Ariz.)

rachilla, cleft nearly to the base, the lobes firm, broad, spreading, the awns black. 2|. —Plains and rocky hills, Wisconsin and South Dakota to Texas, Colorado, Arizona, and California (Jamacha), south through Mexico; also peninsular Florida (fig. 1097). *Bouteloua pectinata* Featherly was differentiated from *B. hirsuta* by taller more robust culms and by a rudimentary spikelet at the end of the rachis. Such a spikelet is rarely developed in *B. hirsuta*, but it is not correlated with robust plants.

14. Bouteloua grácilis (H.B.K.) Lag. BLUE GRAMA. (Fig. 1098.) Perennial; densely tufted; culms erect, 20 to 50 cm tall, leafy at base; blades flat or loosely involute, 1 to 2 mm wide; spikes usually 2, sometimes 1 or 3, rarely more, 2.5 to 5 cm long, falcate-spreading at maturity, the rachis not projecting beyond the spikelets; spikelets numerous, as many as 80, about 5 mm long; fertile lemma pilose, the awns slender, the intermediate lobes acute; rudiment densely bearded at summit of rachilla joint, cleft to the base, the lobes rounded, the

awns slender, about equaling the tip of fertile lemma; one or two additional rudiments, broad and awnless, sometimes developed. ♃ (*B. oligostachya* Torr.)— Plains, Wisconsin to Manitoba and Alberta, south to Missouri, Texas, and southern California; Mexico; introduced in a few places in the Eastern States (fig. 1099).

BOUTELOUA GRACILIS var. STRÍCTA (Vasey) Hitchc. Spikes 4 to 6, usually ascending or appressed. ♃ Rare, Texas and Arizona.

FIGURE 1097.—Distribution of *Bouteloua hirsuta*.

15. Bouteloua breviséta Vasey. (Fig. 1100.) Perennial, wiry, the base perennial, woody, loosely tufted; culms branching, 25 to 40 cm tall; blades 3 to 6 cm long, 1 to 1.5 mm wide, flat or becoming involute, sharp-pointed; spikes mostly 2, sometimes 1, rarely 3, 2 to 3 cm long; spikelets 30 to

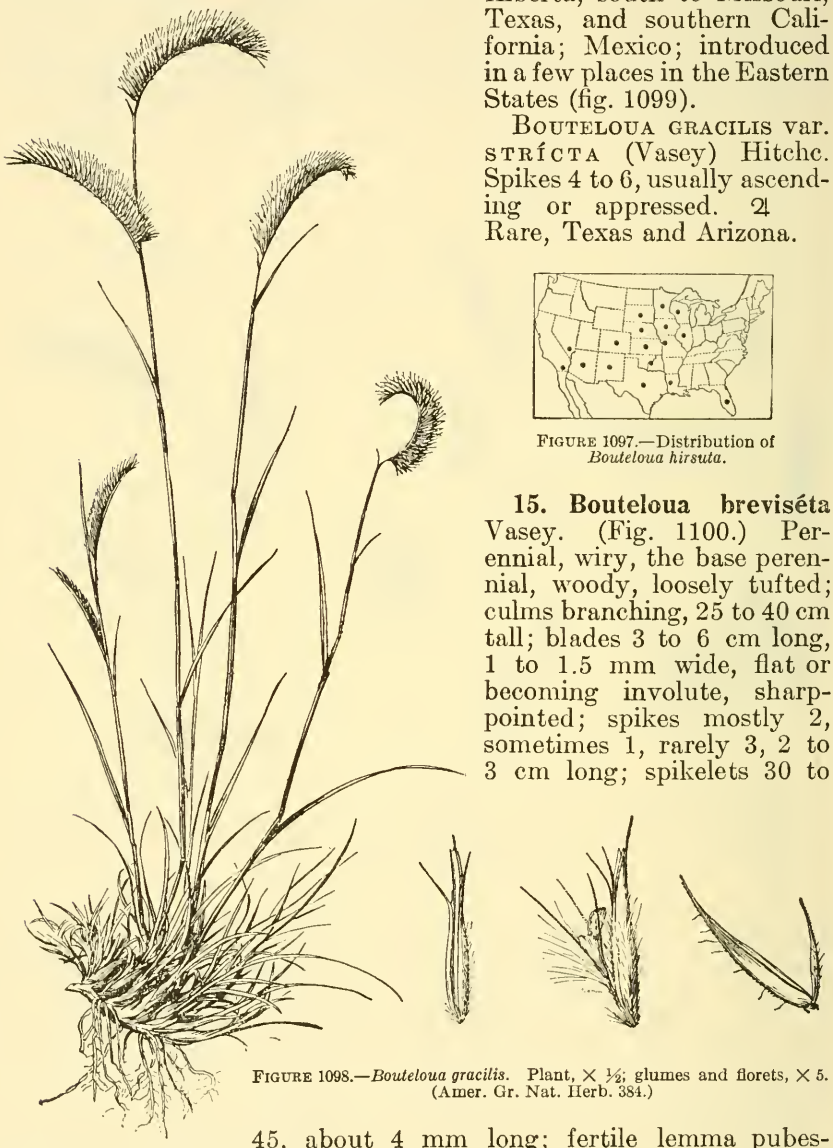

FIGURE 1098.—*Bouteloua gracilis*. Plant, × ½; glumes and florets, × 5. (Amer. Gr. Nat. Herb. 384.)

45, about 4 mm long; fertile lemma pubescent, with 3 awns and acuminate intermediate lobes; rudiment densely bearded at summit of rachilla joint, cleft nearly to the base, the rounded lobes obscured in the dense hairs. ♃ (*B. ramosa*

Scribn.)—Gypsum sands and calcareous rocks, western Texas, New Mexico, and northern Mexico. Resembling *B. gracilis* but with loose, woody base and wiry culms; rachis prolonged and bearing a rudimentary spikelet at the tip.

16. Bouteloua eriopóda (Torr.) Torr. BLACK GRAMA. (Fig. 1101.) Perennial; culms tufted, with swollen bases, slender, wiry, widely spreading with arched internodes or stoloniferous, white-lanate, 40 to 60 cm long; blades 1 to 1.5 mm wide, flexuous; spikes 3 to 8, commonly 4 or 5, loosely ascending, 2 to 3 cm long; spikelets 12 to 20, not crowded and pectinate, 7 to 10 mm long, narrow; fertile lemma acuminate, with a terminal awn, the lateral minute or obsolete; rudiment slender, cleft nearly to the base, the awns equaling the awn of the fertile lemma, the lobes minute, narrow. 2↓ —Mesas, hills, and dry open ground, Texas to southern Utah and northern Mexico (fig. 1102).

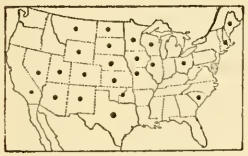

FIGURE 1099.—Distribution of *Bouteloua gracilis*.

FIGURE 1100.—*Bouteloua breviseta*. Panicle, × 1; spikelet, × 5. (Nealley 669, Tex.)

FIGURE 1101.—*Bouteloua eriopoda*. Plant, × 1; spikelet, × 5. (Hitchcock 13357, Tex.)

17. Bouteloua trífida Thurb. (Fig. 1103.) Perennial, tufted, leafy at base, rather delicate; culms erect, 10 to 20 cm tall; blades usually only 1 to 2 cm long; spikes 3 to 7, 1 to 2 cm long, ascending or appressed; spikelets about 12, purplish, 7 to 10 mm long; fertile lemma pubescent toward base, cleft more than half its length, with awns (5 mm long) winged toward base and no intermediate lobes; rudiment cleft to the base, the awns similar to those of the fertile lemma, about as long. 2↓ (*B. trinii* Griffiths; *B. burkii* Scribn.)—Mesas, ravines, and rocky hills, Texas to southwestern Utah and Arizona; California (Death Valley); northern Mexico (fig. 1104). Variable in length of the awns, the type of *B. trífida* being the longer-awned form.

FIGURE 1102.—Distribution of *Bouteloua eriopoda*.

105. CATHÉSTECUM Presl

Spikes consisting of 3 spikelets, the upper or central perfect, the 2 lateral staminate or rudimentary, the spike falling entire; central spikelet with one perfect floret below and one or more reduced florets above; glumes unequal, the first a short, thin, nerveless scale in the central spikelet, narrow and acuminate in the lateral spikelets, the second about as long as the lemma, acuminate, all usually villous; lemma 3-nerved, the nerves extending into awns and the internerves into teeth; nerves of the palea extending into short awns; second and third floret with a fairly well developed lemma and palea, the fourth floret, if present, usually reduced. Low tufted or stoloniferous annuals or perennials, with short blades, and several to many short deciduous spikes approximate on a slender flexuous axis. Type species, *Cathestecum prostratum* Presl. Name from Greek *kathestekos*, set fast, stationary, the application not obvious.

FIGURE 1103.—*Bouteloua trifida*. Panicle, × 1; spikelet, × 5. (Amer. Gr. Nat. Herb. 669, Tex.)

1. Cathestecum eréctum Vasey and Hack. (Fig. 1105.) Perennial with wiry stolons having arched internodes and hairy nodes; culms slender, 10 to 30 cm tall; blades flat, about 1 mm wide, mostly basal; spikes 4 to 8, ovoid, about 5 mm long; lateral spikelets about two-thirds as long as the central spikelet; lemmas of all spikelets similar, the sterile ones more deeply lobed; awns from about as long as the lobes to twice as long, hairy at base. ♃ —Dry hills, western Texas, southern Arizona, and northern Mexico.

106. MUNRÓA Torr.

Spikelets in pairs or threes on a short rachis, the lower 1 or 2 larger, 3- or 4-flowered, the upper 2- or 3-flowered, the group (reduced spikes) enclosed in the broad sheaths of short leaves, usually about 3 in a fascicle, forming a cluster or head at the ends of the branches; rachilla disarticulating above the glumes and between the florets; glumes of the lower 1 or 2 spikelets equal, 1-nerved, narrow, acute, a little shorter than the lemmas, those of the upper spikelet unequal, the first much shorter or obsolete; lemmas 3-nerved, those of the lower spikelet coriaceous, acuminate, the points spreading, the midnerve extended into a mucro, those of the upper spikelet membranaceous; palea narrow, enclosing the oval, dorsally compressed caryopsis. Low spreading, much-branched annual, the short, flat, pungent leaves in fascicles. Type species, *Munroa squarrosa*. Named for William Munro.

FIGURE 1104.—Distribution of *Bouteloua trifida*.

1. Munroa squarrósa (Nutt.) Torr. FALSE BUFFALO GRASS. (Fig. 1106.) Forming mats as much as 50 cm in diameter, the internodes of the prostrate culms scabrous, as much as 10 cm long, the fascicles

at the nodes consisting of several short leafy branches, with 1 or 2 longer branches with slender internodes; blades stiff, mostly less than 3 cm long, 1 to 3 mm wide; fascicles of spikelets about 7 mm long; lemmas with a tuft of hairs on the margin about the middle. ⊙ — Open ground, plains, and hills, at medium altitudes, common in old

FIGURE 1105.—*Cathestecum erectum*. Plant, × ½; group of spikelets, central spikelet, and fertile floret, × 5. (Palmer 161, Mex.)

fields and recently disturbed soil, Alberta and North Dakota to Montana, south to Texas and Arizona (fig. 1107). Occasional plants are found with a white floccose covering, the remains of egg cases of a species of woolly aphid. The variety *floccuosa* Vasey was described from such a specimen.

107. BÚCHLOË Engelm.

(*Bulbilis* Raf.)

Plants dioecious. Staminate spikelets 2-flowered, sessile and closely imbricate, in two rows on one side of a slender rachis, forming a short spike; glumes somewhat unequal, rather broad, 1-nerved, acutish; lemmas longer than the glumes, 3-nerved, rather obtuse,

FIGURE 1106.—*Munroa squarrosa.* Plant, × ½; group of spikelets, spikelet, and floret, × 5. (Zuck 43, Ariz.)

whitish; palea as long as its lemma. Pistillate spikelets mostly 4 or 5 in a short spike or head, this falling entire, usually 2 heads to the inflorescence, the common peduncle short and included in the somewhat inflated sheaths of the upper leaves, the thickened indurate rachis and broad outer (second) glumes forming a rigid white obliquely globular structure crowned by the green-toothed summits of the glumes; first glume (inside) narrow, thin, mucronate, well developed to obsolete in a single head; second glume firm, thick and rigid, rounded on the back, obscurely nerved, expanded in the middle, with inflexed margins, enveloping the floret, abruptly contracted above, the summit with 3 green rigid acuminate lobes; lemma firm-membranaceous, 3-nerved, dorsally compressed, broad below, narrowed into a 3-lobed

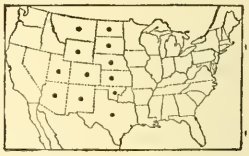

FIGURE 1107.—Distribution of *Munroa squarrosa.*

FIGURE 1108.—*Buchloë dactyloides*. Pistillate and staminate plants, × ½; pistillate spike, and floret, × 5; staminate spikelet, × 5. (Ruth 156, Tex.)

green summit, the middle lobe much the larger; palea broad, obtuse, about as long as the body of the lemma, enveloping the caryopsis. A low stoloniferous perennial with short curly blades, the staminate flowers in 2 or 3 short spikes on slender, erect culms, the pistillate in sessile heads partly hidden among the leaves. Type species, *Buchloë dactyloides*. Name contracted from Greek *boubalos*, buffalo, and *chloë*, grass, a Greek rendering of the common name, "buffalo grass."

FIGURE 1109.—Distribution of *Buchloë dactyloides*.

1. Buchloë dactyloides (Nutt.) Engelm. BUFFALO GRASS. (Fig. 1108.) Gray-green, forming a dense sod, the curly blades forming a covering 5 to 10 cm thick; blades rather sparsely pilose, 1 to 2 mm wide; staminate culms slender, 5 to 20 cm tall, the spikes 5 to 15 mm long; pistillate heads 3 to 4 mm thick. 2♃ —Dry plains, western Minnesota to central Montana, south to northwestern Iowa, Texas, western Louisiana, Arizona, and northern Mexico (fig. 1109). Buffalo grass forms, when unmixed with other species, a close soft grayish-green turf. It is dominant over large areas on the uplands of the Great Plains, colloquially known as the "short-grass country", and is one of the most important grazing grasses of this region. The foliage cures on the ground and furnishes nutritious feed during the winter. The sod houses of the early settlers were made mostly from the sod of this grass.

FIGURE 1110.—*Hierochloë alpina*. Plant, × 1; spikelet and floret, × 5. (Hitchcock 16058, N. H.)

Tribe 8. PHALARIDEAE

108. HIERÓCHLOË R. Br.

(*Savastana* Schrank; *Torresia* Ruiz and Pav.)

Spikelets with one terminal perfect floret and two staminate florets, disarticulating above the glumes, the staminate florets falling attached to the fertile one; glumes equal, 3-nerved, broad, thin and papery, smooth, acute; staminate lemmas about as long as the glumes, boat-shaped, hispidulous, hairy along the margin; fertile lemma somewhat indurate, about as long as the others, smooth or nearly so, awnless; palea 3-nerved, rounded on the back. Perennial, erect, slender, sweet-smelling grasses, with small panicles of broad, bronze-colored spikelets. Type species, *Hierochloë antarctica* (Labill.) R. Br. Name from Greek *hieros*, sacred, and *chloë*, grass, holy grass; *H. odorata* was used in parts of Europe for "strewing before the doors of churches on festival days."

Flowering culms with short blades only (rarely to 10 cm long) with few to many long-leaved sterile shoots at base.
Staminate lemmas bearing exserted awns ..... 1. H. ALPINA.
Staminate lemmas awnless or nearly so ..... 2. H. ODORATA.
Flowering culms with blades 25 to 50 cm long ..... 3. H. OCCIDENTALIS.

1. Hierochloë alpína (Swartz) Roem. and Schult. (Fig. 1110.) Culms 10 to 40 cm tall, tufted, with leafy shoots at base and short rhizomes; blades 1 to 2 mm wide, the basal ones elongate, those of the culm shorter and wider; panicle contracted, 3 to 4 cm long; spikelets short-pediceled, 6 to 8 mm long; staminate lemmas ciliate on the margin, awned below the tip, the awn of the second lemma 5 to 8 mm long, bent, twisted below, that of the first a little shorter, straight; fertile lemma acute, appressed-pubescent toward apex. 2l —Arctic regions, Greenland to Alaska, south to Newfoundland and Quebec; alpine meadows and rocky slopes, high mountains, Maine, New Hampshire, Vermont, and New York; Europe.

2. Hierochloë odoráta (L.) Beauv. SWEETGRASS. (Fig. 1111.) Culms 30 to 60 cm tall, with few to several leafy shoots and slender, creeping rhizomes; blades 2 to 5 mm wide, sometimes wider, those of the sterile shoots elongate, those of the culm mostly less than 5 cm long, rarely to 10 cm long; panicle pyramidal, 4 to 12 cm long, from somewhat compact to loose with slender drooping branches; spikelets mostly short-pediceled, 5 mm long; staminate lemmas awnless or nearly so, fertile lemma pubescent toward the apex. 2l —Meadows, bogs, and moist places, Labrador,

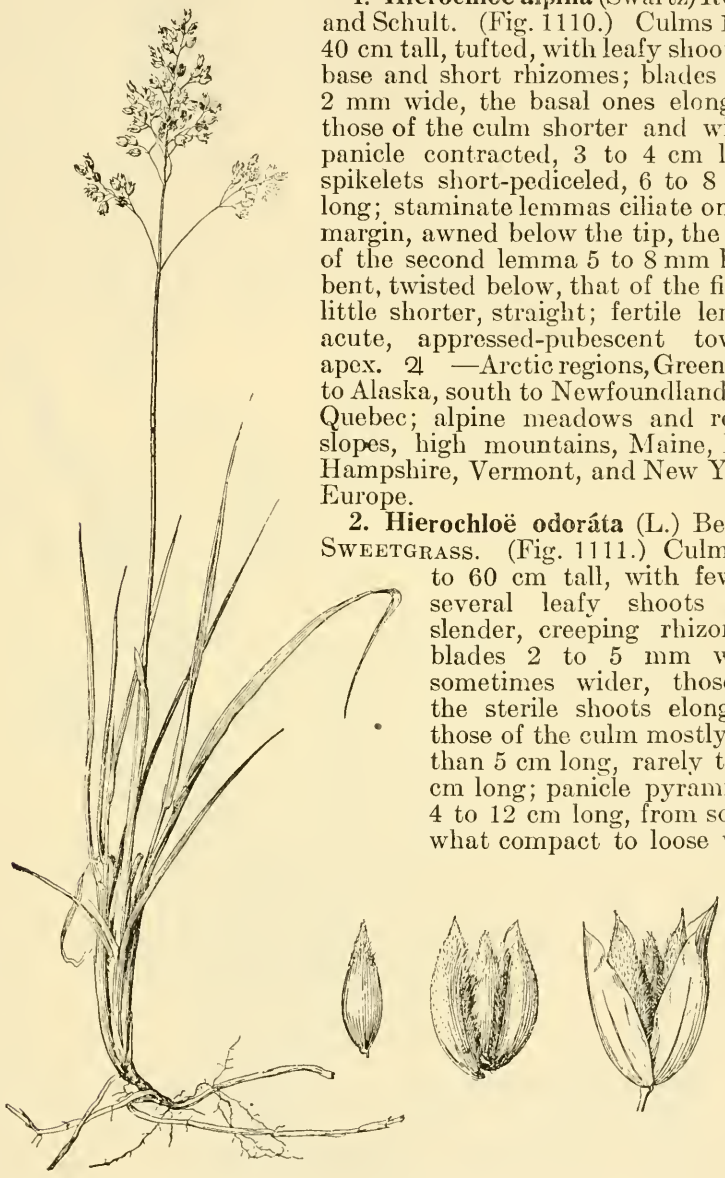

FIGURE 1111.—*Hierochloë odorata*. Plant, × ½; spikelet, florets, and fertile floret, × 5. (Shear 437, Mont.)

to Alaska, south to New Jersey, Indiana, Iowa, Oregon, and in the mountains to New Mexico and Arizona (fig. 1112); Eurasia. The Indians use the grass, known as Seneca grass, to make fragrant baskets. Also called holy grass and vanilla grass. A tall form with culm blades 12 to 17 cm long, and a very loose lax panicle, found in Van Cortlandt Park, New York City, has been described as *Hierochloë nashii* Kaczmarek (*Savastana nashii* Bickn.).

FIGURE 1112.—Distribution of *Hierochloë odorata*.

3. Hierochloë occidentalis Buckl. CALIFORNIA SWEETGRASS. (Fig.1113.) Culms 60 to 90 cm tall, with long leaves and creeping rhizomes; sheaths scabrous; blades flat, rather stiffly upright, 25 to 50 cm long, 8 to 15 mm wide, narrowed to the base, acuminate, scabrous beneath; panicle mostly open, 7 to 15 cm long, the subcapillary branches drooping, loosely flowered or the spikelets aggregate toward the ends, the lower branches 2.5 to 7 cm long; spikelets 4 to 5 mm long, the glumes with a pale shining margin; staminate lemmas awnless or nearly so; fertile lemma appressed-pubescent toward apex. 2n (*H. macrophylla* Thurb.) —Forests in the redwood belt, Oregon to Monterey, Calif., Bingen, Wash.

FIGURE 1113.—*Hierochloë occidentalis*. Plant, × 1; spikelet and fertile floret, × 5. (Bolander, Calif.)

109. ANTHOXÁNTHUM L.
VERNALGRASS

Spikelets with 1 terminal perfect floret and 2 sterile lemmas, the rachilla disarticulating above the glumes, the sterile lemmas falling attached to the fertile floret; glumes unequal, acute or mucronate; sterile lemmas shorter than the glumes, empty, awned from the back; fertile lemma shorter than the sterile ones, awnless; palea 1-nerved, rounded on the back, enclosed in the lemma. Sweet-smelling annuals or perennials, with flat blades and spikelike panicles. Types species, *Anthoxanthum odoratum*. Name from Greek *anthos*, flower, and *xanthos*, yellow, alluding to the yellow inflorescence.

Plants perennial ..... 1. A. ODORATUM.
Plants annual ..... 2. A. ARISTATUM.

1. Anthoxanthum odorátum L. SWEET VERNALGRASS. (Fig. 1114, *A*.) Culms tufted, erect, slender, 30 to 60 cm tall; blades 2 to 5 mm wide; panicle long-exserted, brownish yellow, acute, 2 to 6 cm long; spikelets 8 to 10 mm long; glumes scabrous, the first about half as long as the second; sterile lemmas subequal, appressed-pilose with golden hairs, the first short-awned below the apex, the second awned from near the base, the awn twisted below, geniculate, slightly

FIGURE 1114.—*A*, *Anthoxanthum odoratum*. Plant, × ½; spikelet, sterile lemmas, and fertile floret, × 5 (Biltmore Herb. 74b., N.C.) *B*, *A. aristatum*. Spikelet, sterile florets, and fertile floret, × 5. (White 1591, N.Y.)

exceeding the second glume; fertile lemma about 2 mm long, brown, smooth and shining. 2l —Meadows, pastures, and waste places, Greenland and Newfoundland to Louisiana and Michigan, and on the Pacific coast from British Columbia to northern California (fig. 1115); introduced from Eurasia. Sometimes included in meadow mixtures to give fragrance to the hay but the grass has no forage value.

FIGURE 1115.—Distribution of *Anthoxanthum odoratum*.

2. Anthoxanthum aristátum Boiss. (Fig. 1114, *B*.) Differing from *A. odoratum* in being annual, the culms lower, often geniculate and bushy branching; panicles looser; spikelets a little smaller. ⊙ —Waste places in several localities from Maine to Iowa, Florida, and Mississippi; Vancouver Island; Oregon (fig. 1116); introduced from Europe.

ANTHOXANTHUM GRÁCILE Bivon. Tufted annual; culms 20 cm tall; blades pubescent; panicle silvery; spikelets about 12 mm long, conspicuously awned ⊙ —Occasionally cultivated for dry bouquets. Italy.

110. PHÁLARIS L. CANARY GRASS

Spikelets laterally compressed, with 1 terminal perfect floret and 2 sterile lemmas below (obsolete in *Phalaris paradoxa*), the rachilla disarticulating above the glumes, the usually inconspicuous sterile lemmas falling closely appressed to the fertile floret; glumes equal, boat-shaped, often winged on the keel; sterile lemmas reduced to 2 small usually minute scales (rarely only 1); fertile lemma coriaceous, shorter than the glumes, enclosing the faintly 2-nerved palea. Annuals or perennials, with numerous flat blades, and narrow or spikelike panicles. Type species, *Phalaris canariensis*. *Phalaris*, an old Greek name for a grass.

FIGURE 1116.—Distribution of *Anthoxanthum aristatum*.

Spikelets in groups of 7, 1 fertile surrounded by 6 sterile, the group falling entire. 1. P. PARADOXA.

Spikelets all alike, not in groups falling entire.
- Plants perennial.
  - Rhizomes wanting; panicle dense, ovate or oblong---- 8. P. CALIFORNICA.
  - Rhizomes present; paniele narrow, spreading during anthesis. 9. P. ARUNDINACEA.
- Plants annual.
  - Glumes broadly winged; panicle ovate or short-oblong.
    - Sterile lemma solitary; fertile lemma 3 mm long---------- 4. P. MINOR.
    - Sterile lemmas 2, fertile lemma 4 to 6 mm long.
      - Sterile lemmas 0.6 mm long or less---------- 3. P. BRACHYSTACHYS.
      - Sterile lemmas half as long as fertile---------- 2. P. CANARIENSIS.
  - Glumes wingless or nearly so; panicles oblong or linear, dense.
    - Glumes wingless, acuminate; fertile lemma turgid, the acuminate apex smooth---------- 7. P. LEMMONI.
    - Glumes narrowly winged toward summit, acute or abruptly pointed; fertile lemma less turgid, villous to the acute apex.
      - Paniele tapering to each end, mostly 2 to 6 em long (oecasionally longer). 5. P. CAROLINIANA.
      - Paniele subcylindric, mostly 6 to 15 cm long (oeeasionally smaller). 6. P. ANGUSTA.

1. Phalaris paradóxa L. (Fig. 1117.) Annual, tufted, more or less spreading at base; culms 30 to 60 cm tall; panicle dense, oblong

narrowed at base, 2 to 6 cm long, often enclosed at base in the uppermost enlarged sheath; spikelets finally falling from the axis in groups of 6 or 7, those of the upper part of the panicle slender-pediceled, the central spikelet fertile, the subulate-acuminate glumes with a prominent tooth-like wing near the middle of the keel, the others sterile, with smaller pointed glumes with toothed-winged keels; fertile lemma 3 mm long, with only a few hairs toward the summit, the sterile lemmas obsolete; spikelets of lower part of panicle short-pediceled, the glumes of the outer four spikelets deformed, cuneate-clavate. ⊙ — Occasional in grain fields and waste places, California; ballast, Philadelphia, New Orleans; introduced from Mediterranean region.

PHALARIS PARADOXA var. PRAEMÓRSA (Lam.) Coss. and Dur. Panicle mostly smaller, all the spikelets short-pediceled and with outer sterile spikelets having deformed clavate glumes, as in the lower part of panicle of the species; glumes of all spikelets subindurate. ⊙ —Fields and waste places, Washington to California; ballast, Philadelphia; introduced from Mediterranean region.

FIGURE 1117.—*Phalaris paradoxa.* Plant, × 1; sterile (*A*) and fertile (*B*) spikelets, × 5. (Heller 11391, Calif.)

2. Phalaris canariénsis L. CANARY GRASS. (Fig. 1118.) Annual; culms erect, 30 to 60 cm tall; panicle ovate to oblong-ovate, dense, 1.5 to 4 cm long; spikelets broad, imbricate, pale with green stripes; glumes 7 to 8 mm long, abruptly pointed, the green keel with a prominent pale wing, broadened upward; fertile lemma 5 to 6 mm long, acute, densely appressed-pubescent; sterile lemmas at least half as long as fertile. ⊙ —Waste places, infrequent, Nova Scotia to Alaska, south to Virginia, Kansas, Wyoming, and California, and occasionally southward (fig. 1119); introduced from the western Mediterranean region. This species furnishes the canary seed of commerce.

3. Phalaris brachýstachys Link. (Fig. 1120.) Differing from *P. canariensis* in having smaller spikelets, the glumes about 6 mm long, the fertile lemma 4 to 5 mm long, and especially in the short sterile lemmas not more than 0.6 mm long. ⊙ —Texas (Asherton); California (Butte County); Oregon (ballast, near Portland); introduced from the Mediterranean region.

4. Phalaris minor Retz. (Fig. 1121.) Resembling *P. canariensis;* panicle ovate-oblong, 2 to 5 cm long; spikelets narrower, not so conspicuously striped; glumes 4 to 6 mm long, the wing of the keel narrower; fertile lemma lance-ovate, about 3 mm long, acute; sterile

FIGURE 1118.—*Phalaris canariensis.* Plant, × ½; spikelet and floret, × 5. (Mearns 3376, Wyo.)

lemma solitary, about 1 mm long. ⊙ —Fields and waste places, New Brunswick to New Jersey, rare; Louisiana and Texas; Colorado; ballast, near Portland, Oreg.; frequent in California (fig. 1122); introduced from the Mediterranean region.

5. Phalaris caroliniána Walt. (Fig. 1123.) Annual; culms erect, 30 to 60 cm tall or even more; panicle oblong, 2 to 6 cm long, occasionally longer, tapering to each end; glumes 5 to 6 mm long, oblong, rather abruptly narrowed to an acute apex, the keel scabrous and narrowly winged above from below the middle; fertile lemma lanceolate, acute, appressed-pubescent, about 3.5 to 4 mm long, the sterile lemmas one-third to half as long. ⊙ —Old fields, sandy soil, and moist places, Virginia to Colorado, south to Florida and Texas, west to Arizona, California, and Oregon (fig. 1124). A few specimens from the Pacific coast are relatively robust, up to 80 cm tall, and have panicles 3 to 8 cm long, some of them slightly lobed and not tapering to the base, the spikelets 6 to 6.5 mm long.

FIGURE 1119.—Distribution of *Phalaris canariensis.*

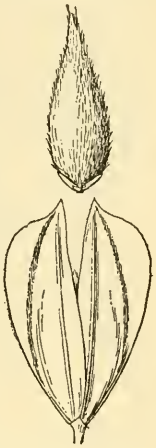

FIGURE 1120.—*Phalaris brachystachys.* Spikelet and floret, × 5. (Suksdorf 1904, Oreg.)

6. Phalaris angústa Nees. (Fig. 1125.) Annual; culms 1 to 1.5 m tall; panicle subcylindric, mostly 6 to 15 cm long, about 8 mm thick; glumes 3.5 to 4 mm long, narrow, abruptly pointed, the keel scabrous and narrowly winged toward the summit; fertile lemma ovate-lanceolate, acute, appressed-pubescent, 3 mm long; sterile lemmas about one-third as long. ⊙ —Open ground at low altitudes, Mississippi, Louisiana, and Texas; California; southern South America.

7. Phalaris lemmóni Vasey. (Fig. 1126.) Annual; culms 30 to 90 cm tall; panicle 5 to 15 cm long, subcylindric or lobed toward base, often purplish; glumes about 5 mm long, narrow, acuminate, scabrous, not winged on the keel; fertile lemma ovate-lanceolate, acuminate, 3.5 to 4 mm long, brown at maturity, appressed-pubescent, except the acuminate tip, sterile lemmas (1 or 2) less than one-third as long. ⊙ —Moist places, at low altitudes, in the coastal valleys, central and southern California.

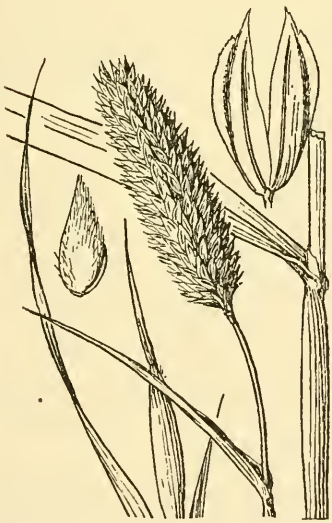

FIGURE 1121.—*Phalaris minor.* Plant, × 1; glumes and floret, × 5. (Ball 1932 Calif.)

FIGURE 1122.—Distribution of *Phalaris minor.*

8. Phalaris califórnica Hook. and Arn. (Fig. 1127.) Perennial, often in dense tussocks; culms erect, 75 to 150 cm tall; blades rather lax, 8 to 15 mm wide; panicle ovoid or oblong, 2 to 5 cm long, 2 to 2.5 cm thick, often purplish tinged; glumes 6 to 8 mm long, narrow, tapering from below the middle to an acute apex, the keel smooth or nearly so, sharp but not winged; fertile lemma ovate-lanceolate, about 4 mm long, rather sparsely appressed-pubescent, the palea

often exposed, the sterile lemmas about half as long. 2↓ —Ravines and open moist ground in the Coast Range, southwestern Oregon to San Luis Obispo County, Calif.

FIGURE 1123.—*Phalaris caroliniana*. Plant, × 1; glumes and floret, × 5. (Hitchcock 1074, Miss.)

9. Phalaris arundinácea L. REED CANARY GRASS. (Fig. 1128.) Perennial, with creeping rhizomes, glaucous; culms erect, 60 to 150 cm tall; panicle 7 to 16 cm long, narrow, the branches spreading during anthesis, the lower as much as 5 cm long; glumes about 5 mm long, narrow, acute, the keel scabrous, very narrowly winged; fertile lemma lanceolate, 4 mm long, with a few appressed hairs; sterile lemmas villous, 1 mm long. 2↓ —Marshes, river banks, and moist places, New Brunswick to southeastern Alaska (also at Tanana Hot Springs, Alaska), south to North Carolina, Kentucky, Oklahoma, New Mexico, Arizona, and northeastern California (fig. 1129); Eurasia. An important constituent of lowland hay from Montana to Wisconsin. PHALARIS ARUNDINACEA var. PÍCTA L. RIBBON GRASS. Blades striped with white. ⊙ —Grown for ornament in gardens; also called gardener's garters.

FIGURE 1124.—Distribution of *Phalaris caroliniana*.

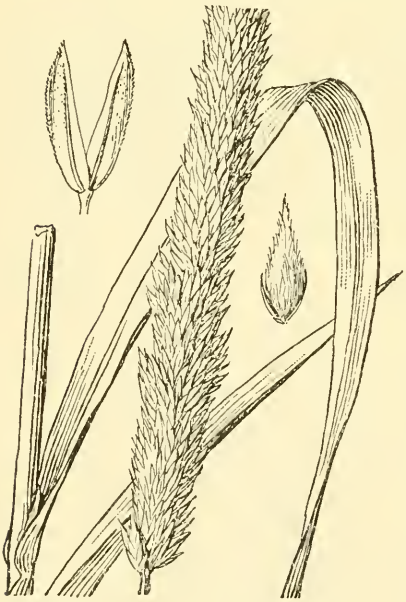

FIGURE 1125.—*Phalaris angusta*. Plant, × 1; glumes and floret, × 5. (Suksdorf 32, Calif.)

PHALARIS TUBEROSA var. STENÓPTERA (Hack.) Hitchc. (Fig. 1130.) Perennial, with a loose branching, rhizomatous base; culms stout, as much as 1.5 m tall; panicle 5 to 15 cm long, 1.5 cm wide, slightly lobed; glumes 5 to 6 mm long, the keel scabrous, rather narrowly winged on the upper two-thirds; fertile lemma 4 mm long, ovate-lanceolate, acute, appressed-pubescent; sterile lemma usually solitary, about one-third as long as fertile lemma. 2↓ —About 1902 there appeared in Queensland, Australia, the source unknown, a species of *Phalaris* which gave promise of being a valualeb forage

FIGURE 1126.—*Phalaris lemmoni*, × 5. (Type.)

grass. About 1907 it was distributed from the Toowoomba Botanic Gardens, Queensland. Stapf, of Kew Gardens, identified this grass as *P. bulbosa* L. Hackel described it as a distinct species, *P. stenoptera*. It has been grown at the California Experiment Station, and

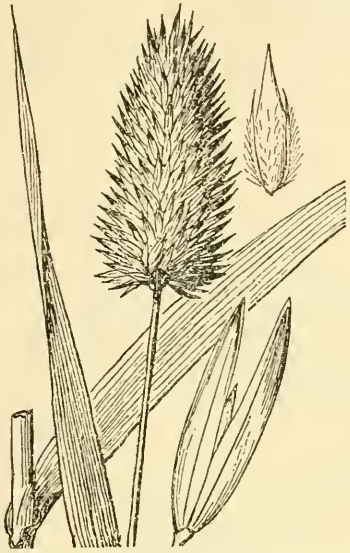

FIGURE 1127.—*Phalaris californica*. Plant, × 1; spikelet and floret, × 5. (Heller 6677, Calif.)

FIGURE 1128.—*Phalaris arundinacea*. Plant, × 1; glumes and floret, × 5. (Chase 7583, Md.)

the above description was drawn from a plant supplied by Professor Kennedy from the University Farm at Davis, the seed being from South Africa. This differs from the typical *P. tuberosa* of the Mediterranean region in having short vertical or ascending, sometimes branching rhizomes, the base of the culms little or not at all swollen. It has been called Harding grass. Burbank has distributed it as *P. stenophylla* (error for *stenoptera*), calling it Peruvian winter grass. This species has been called *P. bulbosa*, but the true *P. bulbosa* L. is a species of *Phleum* (*P. tenue* Schrad.; *P. bulbosum* (L.) Richt.).

FIGURE 1129.—Distribution of *Phalaris arundinacea*.

FIGURE 1130.—*Phalaris tuberosa* var. *stenoptera*, × 5. (McCrary, N. C.)

TRIBE 9. ORYZEAE

111. ORÝZA L. RICE

Spikelets 1-flowered, laterally compressed, disarticulating below the glumes; glumes 2, much shorter than the lemma, narrow; lemma rigid, keeled, 5-nerved, the outer nerves near the margin, the apex sometimes awned; palea similar to the lemma, narrower, keeled, with a median bundle but with no strong midnerve on the back, 2-nerved close to the margins. Annual or sometimes perennial swamp grasses, often tall, with flat blades and spikelets in open panicles. Type species, *Oryza sativa*. Name from *oruza*, old Greek name for rice.

FIGURE 1131.—*Oryza sativa*. Plant, × ½; spikelet, × 5. (Cult.)

1. Oryza satíva L. RICE. (Fig. 1131.) Annual, or in tropical regions sometimes perennial; culms erect, 1 to 2 m tall; blades elongate; panicle rather dense, drooping, 15 to 40 cm long; spikelets 7 to 10 mm long, 3 to 4 mm wide; lemma and palea papillose-roughened and with scattered appressed hairs, the lemma from mucronate to long-awned. ⊙ —Cultivated in all warm countries at low altitudes where there is sufficient moisture; one of the world's most important food plants; sometimes adventive near the coast from Virginia to Florida and Texas.

112. LEÉRSIA Swartz

(*Homalocenchrus* Mieg.)

Spikelets 1-flowered, strongly compressed laterally, disarticulating from the pedicel; glumes wanting; lemma chartaceous, broad, oblong to oval, boat-shaped, usually 5-nerved, the lateral pair of nerves close to the margins, these and the keel often hispid-ciliate, the intermediate nerves sometimes faint; palea as long as the lemma, much narrower, usually 3-nerved, the keel usually hispid-ciliate, the lateral nerves close to the margins, the margins firmly held by the margins of the lemma; stamens 6 or fewer. Perennials, usually with creeping rhizomes, flat, scabrous blades, and mostly open panicles. Type species, *Leersia oryzoides*. Named for J. D. Leers.

FIGURE 1132.—*Leersia lenticularis*, × 1. (McDonald 68, Ill.)

FIGURE 1133.—Distribution of *Leersia lenticularis*.

Spikelets broadly oval, 3 to 4 mm wide ..... 1. L. LENTICULARIS.
Spikelets elliptic, not more than 2 mm wide.
  Panicle narrow, the branches ascending or appressed ..... 4. L. HEXANDRA.
  Panicle open, the capillary branches finally spreading.
    Spikelets glabrous, about 2 mm long; culms tufted, erect; rhizomes wanting. 5. L. MONANDRA.
    Spikelets hispidulous; culms decumbent at base; rhizomes present.
      Lower panicle branches solitary; spikelets 3 mm long, 1 mm wide. 3. L. VIRGINICA.
      Lower panicle branches fascicled; spikelets 5 mm long, 1.5 to 2 mm wide. 2. L. ORYZOIDES.

1. Leersia lenticuláris Michx. CATCHFLY GRASS. (Fig. 1132.) Culms straggling, 1 to 1.5 m tall, with creeping scaly rhizomes; sheaths scabrous at least toward the summit; blades lax, 1 to 2 cm wide; panicle open, drooping, 10 to 20 cm long, the branches ascending or spreading, naked below, branched above, branchlets bearing closely imbricate spikelets along one side; spikelets pale, broadly oval, very flat, 4 to 5 mm long, sparsely hispidulous, the keels bristly ciliate. 2↓ —Ditches and swamps, Indiana to Minnesota, south to South Carolina, Florida, and Texas (fig. 1133).

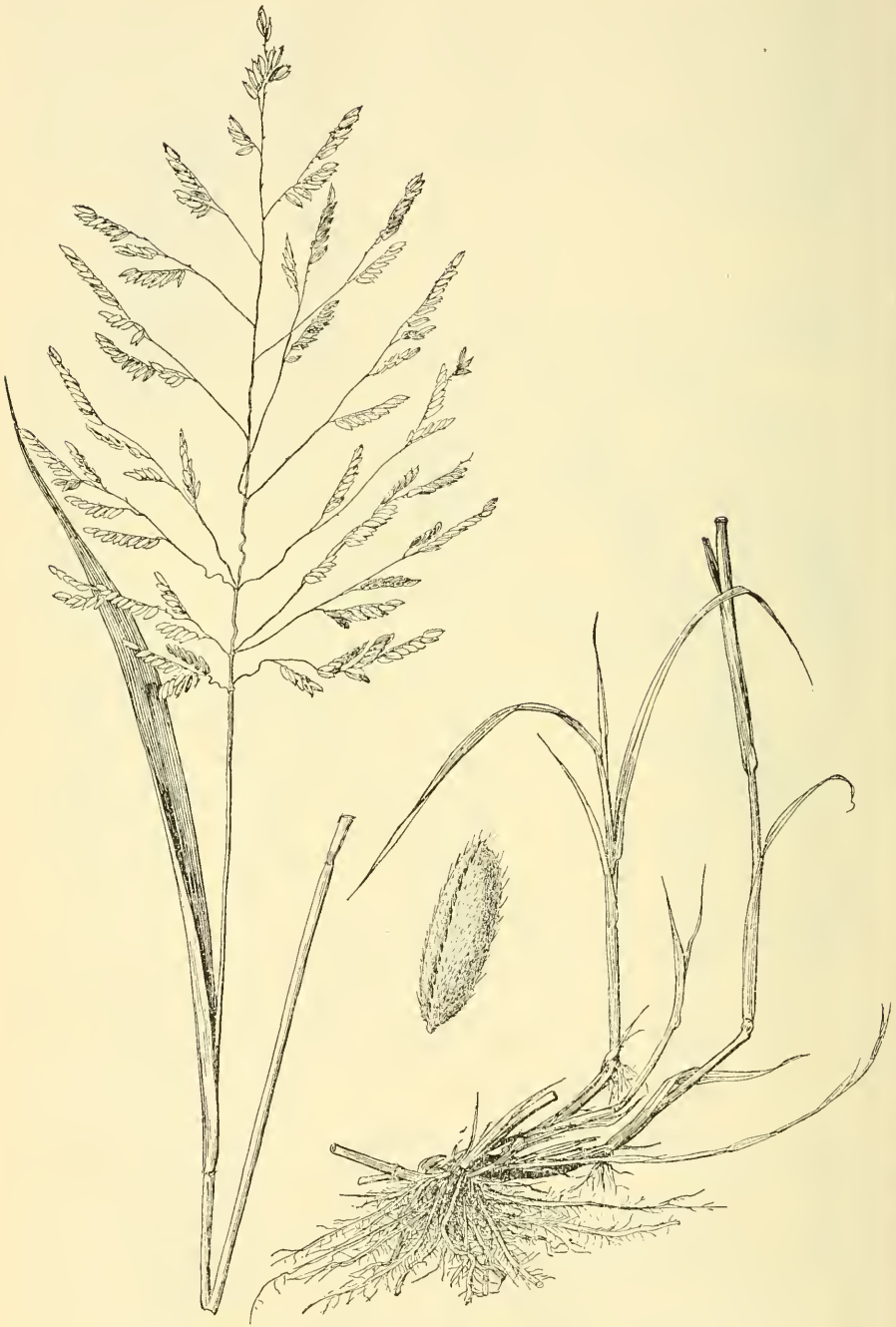

FIGURE 1134.—*Leersia oryzoides*. Plant, × ½; spikelet, × 5. (Hitchcock 5317, Tex.)

2. Leersia oryzoides (L.) Swartz. RICE CUTGRASS. (Fig. 1134.) Culms slender, weak, often decumbent at base, 1 to 1.5 m tall, with slender creeping rhizomes; sheaths and blades strongly retrorsely scabrous, the blades mostly 8 to 10 mm wide; panicles terminal and axillary, 10 to 20 cm long, the flexuous branches finally spreading, the spikelets more loosely imbricate than in *L. lenticularis*; spikelets elliptic, 5 mm long, 1.5 to 2 mm wide, sparsely hispidulous, the keels bristly ciliate; axillary panicles reduced, partly included in the sheaths, the spikelets cleistogamous. 2|4 —Marshes, river banks, and wet places, often forming a zone around ponds and lakes, Quebec and Maine to eastern Washington south to northern Florida, Texas, Colorado, Arizona, and southeastern California (fig. 1135); Europe. The late cleistogamous phase has been described as *L. oryzoides* forma *inclusa* (Wiesb.) Dörfl.

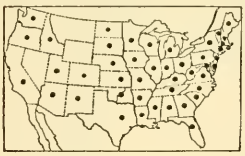

FIGURE 1135.—Distribution of *Leersia oryzoides*.

FIGURE 1136.—*Leersia virginica*, × 1. (French, Iowa.)

3. Leersia virginica Willd. WHITEGRASS. (Fig. 1136.) Culms slender, weak, branching, 50 to 120 cm tall, with clusters of very scaly rhizomes much stouter than the culm base; blades relatively short, 6 to 12 mm wide; panicle open, 10 to 20 cm long, the capillary branches rather distant, stiffly spreading, naked below, those of the branches smaller, sometimes included in the sheath; spikelets oblong, closely appressed to the branchlets, about 3 mm long and 1 mm wide, sparsely hispidulous, the keels short-hispid. 2|4 —Low woods and moist places, Quebec to South Dakota, south to Florida and Texas (fig. 1137).

FIGURE 1137.—Distribution of *Leersia virginica*.

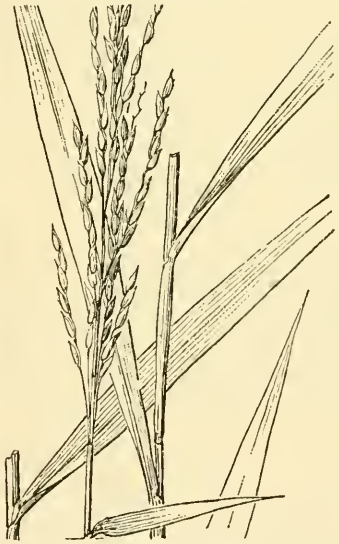

FIGURE 1138.—*Leersia hexandra*, × 1. (Wurzlow, La.)

4. Leersia hexándra Swartz. (Fig. 1138.) Culms slender, weak, usually long-decumbent from a creeping and rooting base, with slender rhizomes and extensively creeping leafy stolons; the flowering culms upright; blades rather stiff, 2 to 5 mm wide; panicle narrow, 5 to 10 cm long, the branches ascending or

appressed, floriferous nearly to the base; spikelets oblong, about 4 to 5 mm long, a little more than 1 mm wide, often purplish, sparsely hispidulous, the keels bristly ciliate. 2↓ —Shallow water, ditches, and wet places near the coast, North Carolina to Florida and Texas (fig. 1139); widely distributed in the tropics of both hemispheres.

FIGURE 1139.—Distribution of *Leersia hexandra*.

5. Leersia monándra Swartz. (Fig. 1140.) Culms tufted, erect, wiry, 50 to 100 cm tall, without rhizomes; sheaths smooth or nearly so; blades elongate, 1 to 5 mm wide; panicle open, the capillary solitary branches spreading, naked below, the small spikelets near the ends; spikelets pale, broadly ovate, glabrous, about 2 mm long. 2↓ —Rocky woods and prairies, Florida Keys, southern Florida, and southern Texas; West Indies.

TRIBE 10. ZIZANIEAE

113. ZIZÁNIA L. Wildrice

Spikelets unisexual, 1-flowered, disarticulating from the pedicel; glumes obsolete, represented by a small collarlike ridge; pistillate spikelet terete, angled at maturity; lemma chartaceous, 3-nerved, tapering into a long slender awn; palea 2-nerved, closely clasped by the lemma; grain cylindric, 1 to 2 cm long; staminate spikelet soft; lemma 5-nerved, membranaceous, linear, acuminate or awn-pointed; palea about as long as the glume, 3-nerved; stamens 6. Tall aquatic annuals or perennials, with flat blades and large terminal panicles, the lower branches ascending or spreading, bearing the pendulous staminate spikelets, the upper branches ascending, at maturity erect, bearing appressed pistillate spikelets, the staminate spikelets early deciduous, the pistillate spikelets tardily deciduous. Type species, *Zizania aquatica*. Name from *Zizanion*, an old Greek name for a weed growing in grain, the tares of the Scripture parable.

FIGURE 1140.—*Leersia monandra*, × 1. (Nealley, Tex.)

The seeds of wild rice were used by the aborigines for food and are still used to some extent by some of the northern tribes of Indians. Wildrice is important as a food and shelter for water fowl and is sometimes planted for this purpose in marshes on game preserves. The thickened bases of the culms of the Asiatic *Z. latifolia* (Griseb.) Turcz. are used as a vegetable called Kau sun.

Plants annual, erect ..... 1. Z. AQUATICA.
Plants perennial, long-decumbent at base ..... 2. Z. TEXANA.

1. Zizania aquática L. Annual wildrice. (Fig. 1141.) Annual; culms robust, usually 2 to 3 m tall; blades elongate, 1 to 4 cm wide, scaberulous; panicles mostly 30 to 50 cm long, the branches mostly 15 to 20 cm long. ⊙ —Marshes and borders of streams and ponds, usually in shallow water, Quebec to North Dakota, south to Florida and Louisiana; Idaho (fig. 1142).

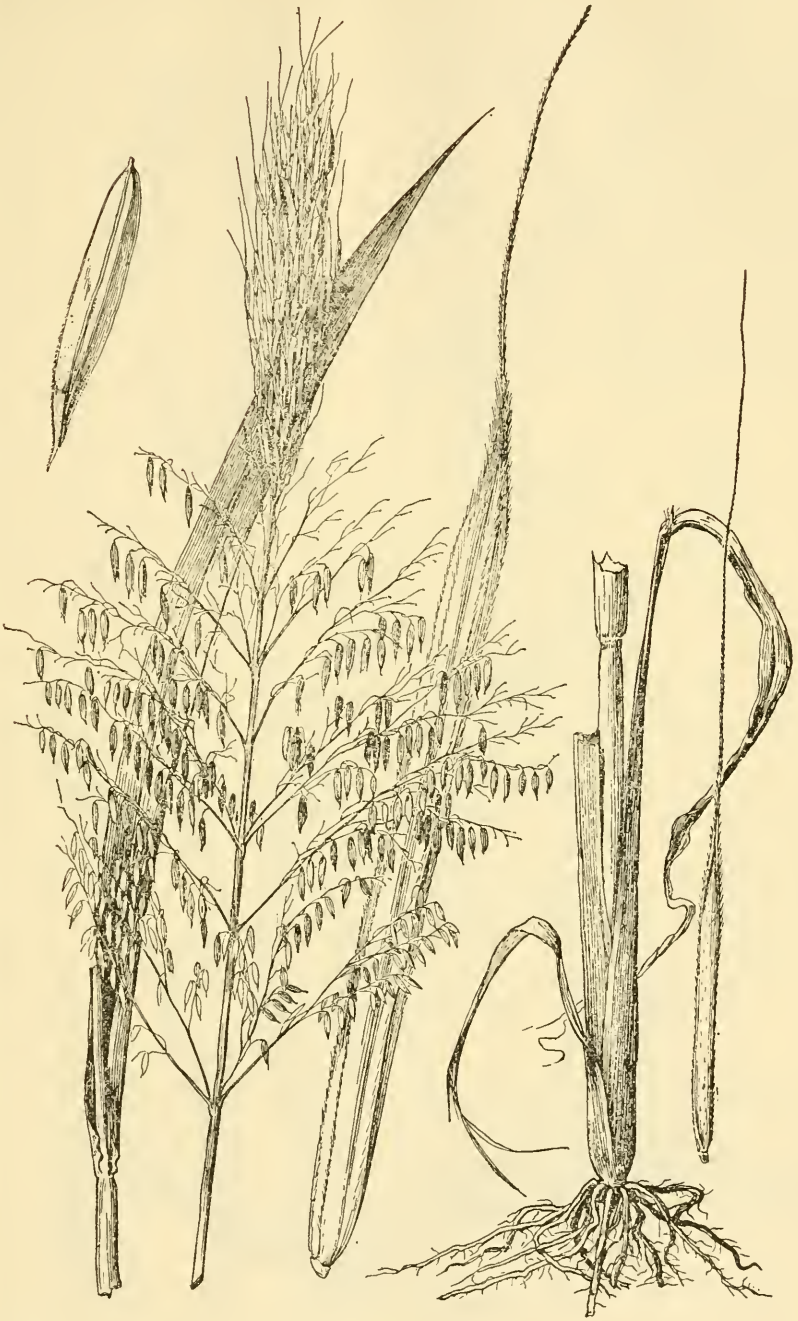

FIGURE 1141.—*Zizania aquatica*. Plant, × ½; pistillate spikelet, × 2; second view, × 5; staminate spikelet, × 5. (Fink, Iowa.)

ZIZANIA AQUATICA var. ANGUSTIFÓLIA Hitchc. NORTHERN WILD-RICE. Culms usually not more than 1.5 m tall; blades usually not more than 1 cm wide. ⊙ —Shallow water, Quebec and New Brunswick to North Dakota, south to New York and Nebraska.

2. Zizania texána Hitchc. TEXAS WILDRICE. (Fig. 1143.) Perennial; culms long-decumbent and rooting at base, 1 to 3 m long; blades elongate, 3 to 15 or even 20 mm wide; panicle 20 to 30 cm long, narrow, the lower (staminate) branches ascending, 5 to 10 cm long; staminate spikelets 7 to 8 mm long, 1.5 mm wide; pistillate spikelets about 1 cm long, tapering into an awn 1 to 2 cm long. ♃ —Growing in rapidly flowing water, San Marcos, Tex. The grass grows in water 30 to 120 cm deep, the lower part of the plant prostrate or floating on the water, the upper part erect. Flowers from April to November and at warm periods during winter. Said to be troublesome in irrigation ditches.

FIGURE 1142.—Distribution of *Zizania aquatica*.

114. ZIZANIÓPSIS Doell and Aschers.

Spikelets unisexual, 1-flowered, disarticulating from the pedicel, mixed on the same branches of the panicle, the staminate below; glumes wanting; lemma 7-nerved, short-awned in the pistillate spikelets; palea 3-nerved; staminate spikelets with 6 stamens; styles rather long, united; fruit obovate, free from the lemma and palea,

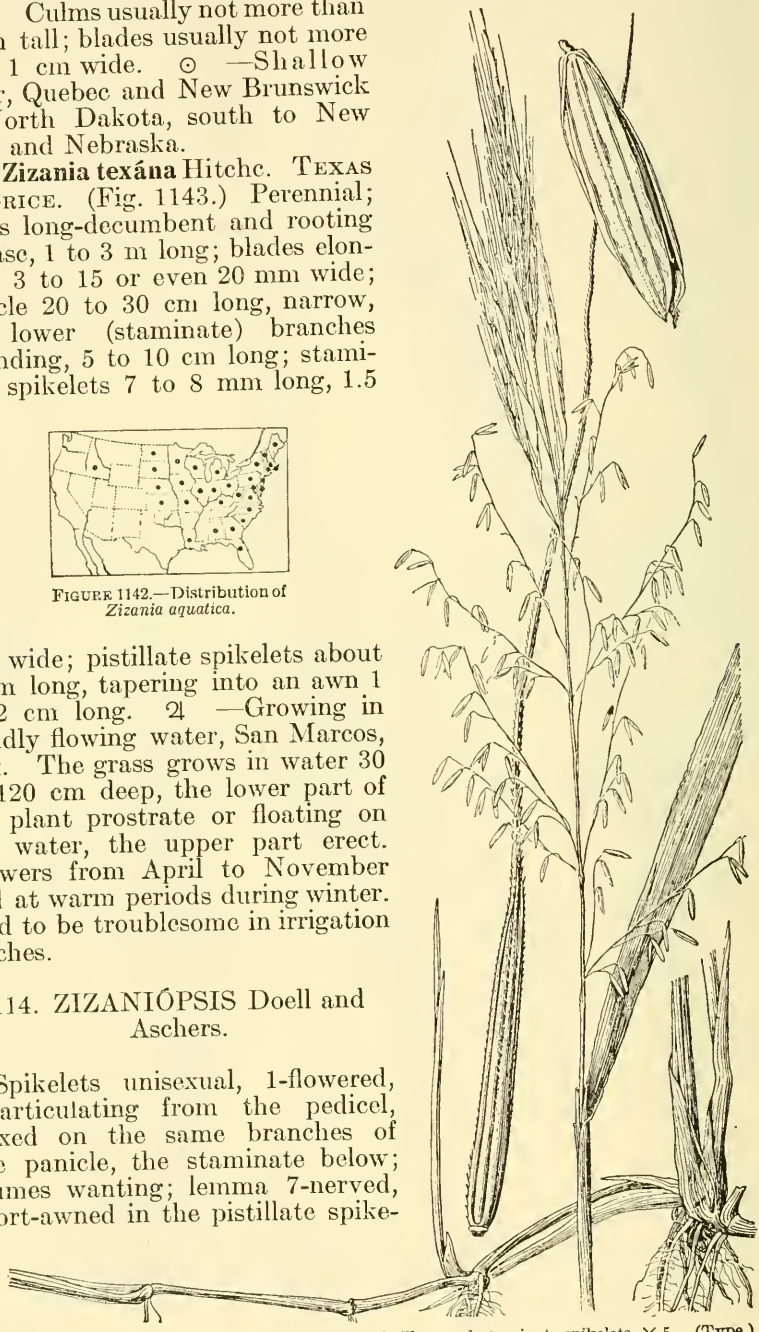

FIGURE 1143.—*Zizania texana*. Plant, × ½; pistillate and staminate spikelets, × 5. (Type.)

FIGURE 1144.—*Zizaniopsis miliacea*. Plant, × ½; staminate spikelet, pistillate spikelet, and ripe caryopsis, × 5. (Chase 7121, S.C.)

coriaceous, smooth and shining, beaked with the persistent style; seed free from the pericarp. Robust perennial marsh grasses, with stout creeping rhizomes, broad flat blades, and large open panicles. Type species, *Zizaniopsis microstachya* Nees. Name from *Zizania*, a generic name, and Greek *opsis*, appearance, alluding to the similarity to *Zizania*.

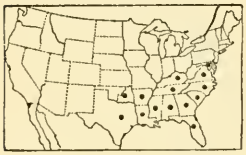

FIGURE 1145.—Distribution of *Zizaniopsis miliacea*.

1. Zizaniopsis miliácea (Michx.) Doell and Aschers. (Fig. 1144.) SOUTHERN WILDRICE. Culms 1 to 3 m tall or even taller; blades glabrous except the very scabrous margins, 1 to 2 cm wide, the midrib stout; panicle rather narrow, nodding, 30 to 50 cm long, the numerous branches fascicled, as much as 15 to 20 cm long, naked at base; spikelets 6 to 8 mm long, short-awned, the staminate slender, the pistillate turgid at maturity. 2l —Marshes, creeks, and river banks, Maryland to Kentucky and Oklahoma, south to Florida and Texas (fig. 1145).

115. LUZÍOLA Juss.

Spikelets unisexual, 1-flowered, disarticulating from the pedicel, the staminate and pistillate spikelets in separate panicles on the same plant; glumes wanting; lemma and palea about equal, thin, several to many-nerved, lanceolate or oblong; stamens 6 or more; stigmas long, plumose; grain free, globose, finely striate. Creeping, low or delicate perennials, with narrow flat blades and terminal and axillary panicles. Type species, *Luziola peruviana*. Name modified from *Luzula*, a genus of Juncaceae.

Pistillate spikelets ovoid, about 2 mm long; staminate and pistillate panicles on the same shoot ..... 1. L. PERUVIANA.
Pistillate spikelets oblong-lanceolate, 4 to 5 mm long; staminate and pistillate panicles on different shoots ..... 2. L. BAHIENSIS.

1. Luziola peruviána Gmel. (Fig. 1146.) Culms slender, branching, the flowering shoots ascending, 10 to 40 cm tall; blades 1 to 4 mm wide, exceeding the panicles; staminate panicles terminal, narrow, the spikelets about 7 mm long; pistillate panicles terminal and axillary, 3 to 6 cm long, about as wide, the spikelets about 2 mm long, ovoid at maturity, abruptly pointed. 2l —Muddy ground and wet meadows, Florida (Pensacola) and Louisiana (vicinity of New Orleans); Mexico and Cuba, south to Argentina.

2. Luziola bahiénsis (Steud.) Hitchc. (Fig. 1147.) Extensively stoloniferous, the flowering shoots not more than 15 cm tall, mostly less; blades 2 to 4 mm wide, much exceeding the panicles; panicles mostly terminal, the staminate few-flowered, the spikelets about 5 mm long; pistillate panicles 4 to 6 cm long, the few stiff branches finally spreading, with a few appressed oblong-lanceolate spikelets 4 to 5 mm long, the lemma and palea much exceeding the caryopsis. 2l —Lagoons and banks of streams, southern Alabama; Cuba. Brazil.

116. HYDRÓCHLOA Beauv.

Spikelets unisexual, 1-flowered, disarticulating from the pedicel, the staminate and pistillate spikelets in separate panicles on the same plant; glumes wanting; staminate spikelets with a thin 7-nerved lemma, a 2-nerved palea, and 6 stamens; pistillate spikelets with a

FIGURE 1146.—*Luziola peruviana*. Plant, × ½; pistillate and staminate spikelets, × 5 (Curtiss 6871, Fla.)

thin 7-nerved lemma and 5-nerved palea, the stigmas long and slender. A slender, branching, aquatic grass, probably perennial, the leaves floating; staminate spikelets in small few-flowered terminal racemes; pistillate spikelets in few-flowered racemes in the axils of the leaves. Type species, *Hydrochloa caroliniensis*. Name from Greek *hudor*, water, and *chloa*, grass, alluding to the habitat.

1. Hydrochloa caroliniénsis Beauv. (Fig. 1148.) Culms up to 1 m or more long, freely branching, leafy; blades flat, 1 to 3 cm long, 1 to 2 mm wide, in vigorous shoots as much as 6 cm long and 5 mm wide; spikelets inconspicuous and infrequent, the staminate about 4 mm long, the pistillate about 2 mm. ♃ —Ponds and slow-flowing streams, sometimes in sufficient abundance to become troublesome. South Carolina to Florida and Louisiana (fig. 1149). Eaten by livestock. Lemma 5- or 7-nerved; palea 4- to 7-nerved. (Weatherwax.)

117. PHÁRUS L.

Spikelets in pairs, appressed along the slender spreading, nearly simple panicle branches, one pistillate, subsessile, the other staminate, pedicellate, much smaller than the pistillate spikelet; fertile lemma subindurate, terete, clothed, at least toward the beaked apex, with thick uncinate hairs; blades petioled (the petiole with a single twist reversing the upper and under surfaces of the blade), the nerves running from midnerve to margin, with fine transverse veins between the nerves. Perennials with broad flat elliptic or oblanceolate blades and terminal panicles with rather few stiffly spreading branches breaking readily at maturity, the terete pistillate spikelets appressed, the uncinate fruits acting like burs. Type species, *Pharus latifolius* L. Name from Greek *pharos*, cloth or mantle, possibly alluding to the broad blades.

FIGURE 1147.—*Luziola bahiensis*, × 1. (Mohr, Ala.)

1. Pharus parvifólius Nash. (Fig. 1150.) Culms long-decumbent and rooting at base, the flowering shoot 30 to 50 cm tall; blades elliptic, abruptly acuminate, 10 to 20 cm long, 2 to 4 cm wide; panicles mostly 10 to 20 cm long, about as wide; pistillate spikelets about 1 cm long, the glumes thin, brown, less than half as long as the lemma; staminate spikelets about 3 mm long, the slender pedicels appressed to the pistillate spikelets. ♃ —Rocky woods, Florida, rare (Pineola; Orange Lake); West Indies to Brazil.

TRIBE 11. MELINIDEAE

118. MELÍNIS Beauv.

Spikelets small, dorsally compressed, 1-flowered with a sterile lemma below the fertile floret, the rachilla disarticulating below the glumes; first glume minute; second glume and sterile lemma similar, membranaceous, strongly nerved, slightly exceeding the fertile floret;

fertile lemma and palea subhyaline toward summit. Perennials

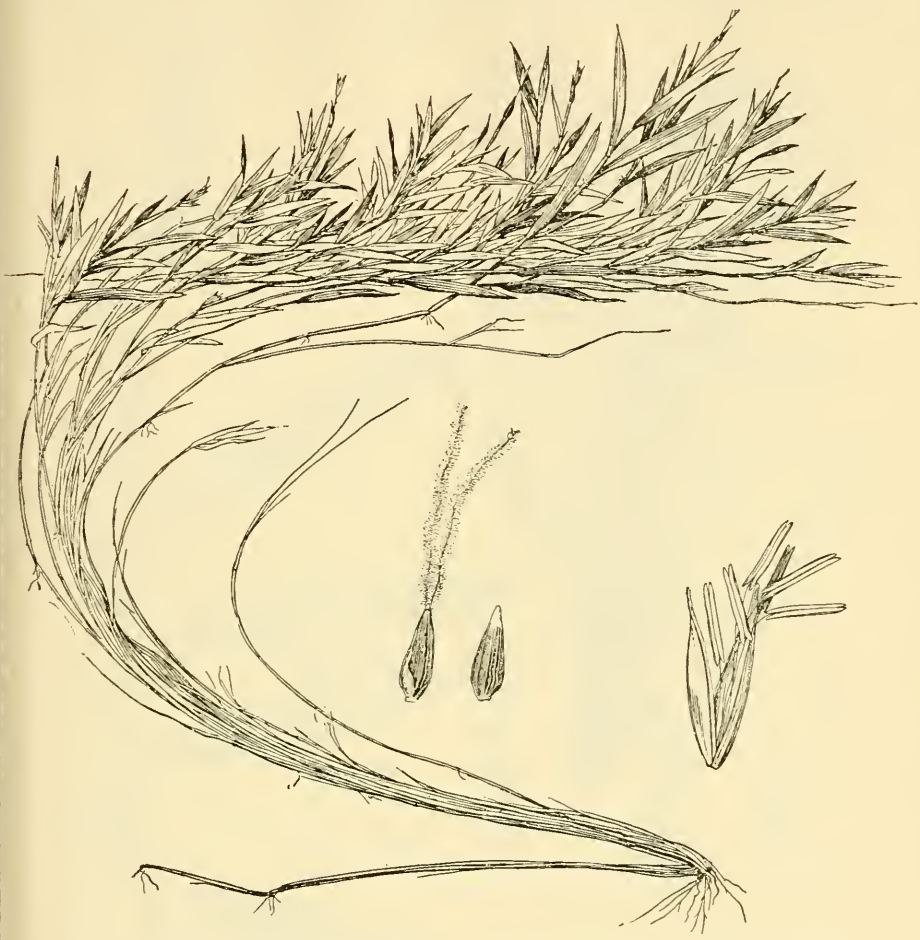

FIGURE 1148.—*Hydrochloa caroliniensis.* Plant, × ½; two views of pistillate spikelet and staminate spikelet, × 5. (Nash 1152, Fla.)

with slender, branching, decumbent culms and narrow many-flowered panicles, with capillary branchlets and pedicels. Type species, *Melinis minutiflora.* Name from Greek *meline*, millet.

FIGURE 1149.—Distribution of *Hydrochloa caroliniensis.*

1. Melinis minutiflóra Beauv. MOLASSES GRASS. (Fig. 1151.) Culms ascending from a tangled much branched base, as much as 1 m tall; the foliage viscid-pubescent; blades flat, 5 to 15 cm long, 5 to 10 mm wide; panicle 10 to 20 cm long, purplish; spikelets about 2 mm long, the sterile lemma 2-lobed, with a delicate awn 1 to 10 mm long from between the lobes. ♃ —Introduced from Brazil, though

FIGURE 1150.—*Pharus parvifolius*, × ½. (Miller 1231, Dominican Republic.)

native of Africa. Cultivated for forage and spreading in open ground through Central and South America and the West Indies. It has been tried successfully in southern Florida. The grass has a heavy sweetish odor when fresh. Called in Brazil capím gordura.

THYSANOLAÉNA MÁXIMA (Roxb.) Kuntze. Robust perennial, 1 to 3 m tall; blades 3 to 7 cm wide; panicle commonly 1 m long, the slender densely-flowered branches drooping; spikelets about 2 mm long, pointed; fertile lemma long-ciliate. ♃ —Introduced in southern Florida and southern California as an ornamental.

TRIBE 12. PANICEAE

119. ANTHAENÁNTIA Beauv.

Spikelets obovoid; first glume wanting; second glume and sterile lemma about equal, 5-nerved, the broad internerves infolded, densely villous, the sterile lemma with a small palea and sometimes with a staminate flower; fertile lemma cartilaginous, brown, with narrow pale hyaline margins, boat-shaped, 3-nerved, subacute. Erect perennials with short creeping rhizomes, narrow, firm, flat blades, the uppermost much reduced, and narrow panicles, the slender branches ascending or appressed. Type species, *Anthaenantia villosa*. Name from Greek *anthos*, flower, and *enantios* contrary. (Beauvois misinterpreted the structure of the spikelet.)[9]

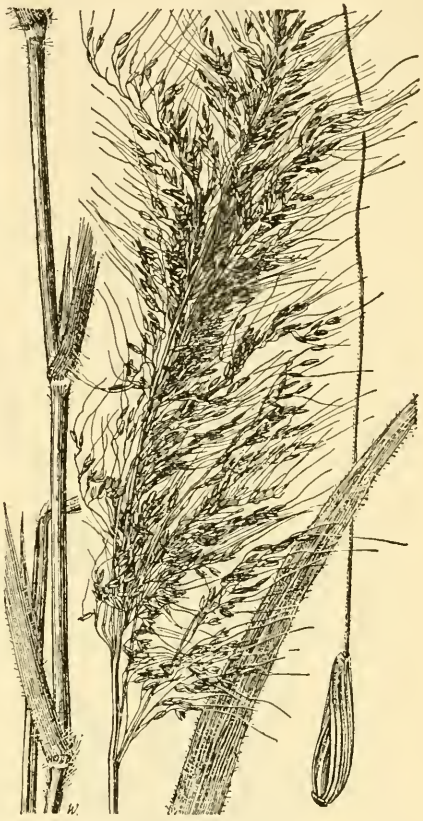

FIGURE 1151.—*Melinis minutiflora*. Plant, × 1; spikelet, × 10. (Moldenke 453, Fla.)

In pine barrens *A. rufa* may be an important element in the natural pasture.

Blades erect or spreading, rather blunt or rounded at the apex, linear, folded at base; panicle usually purple ..... 1. A. RUFA.
Blades ascending or spreading (on the average shorter and broader than in *A. rufa*), tapering to the apex, rounded at base; panicle usually pale .. 2. A. VILLOSA.

1. Anthaenantia rúfa (Ell.) Schult. (Fig. 1152, *A.*) Culms slender, 60 to 120 cm tall; blades elongate, 3 to 5 mm wide, often scabrous; panicle 8 to 15 cm long, usually purple; spikelets 3 to 4 mm long. ♃ —Moist pine barrens, Coastal Plain, North Carolina to Florida and eastern Texas (fig. 1153).

2. Anthaenantia villósa (Michx.) Beauv. (Fig. 1152, *B.*) Differing from *A. rufa* in the wider, mostly shorter, spreading blades and in the usually pale panicles. ♃ —Dry pine barrens, Coastal Plain, North Carolina to Florida and Louisiana (fig. 1154).

[9] See Contr. U. S. Nat. Herb. 24: 170. 1925.

FIGURE 1152.—*A*, *Anthaenantia rufa*, × 1. (Amer. Gr. Nat. Herb. 290, N.C.) *B*, *A. villosa*. Plant, × ½; spikelet and floret, × 10. (Chase 4605, N.C.)

120. TRICHÁCHNE Nees

(*Valota* Adans. inadequately published)

Spikelets lanceolate, in pairs, short-pediceled, in two rows along one side of a slender rachis; first glume minute, glabrous; second

glume and sterile lemma about as long as the fruit, 3- to 5-nerved, copiously silky; fertile lemma cartilaginous, lanceolate, acuminate, usually brown, the flat white hyaline margins broad. Perennials with slender erect or ascending racemes, approximate to rather distant along a slender main axis, forming a white to brownish silky panicle. Type species, *Trichachne insularis*. Name from Greek *thrix* (*trich-*), hair, and *achne*, chaff, alluding to the silky spikelets.

FIGURE 1153.—Distribution of *Anthaenantia rufa*.

Trichachne insularis is not relished by cattle, hence the name sourgrass by which it is called in the West Indies; *T. californica* is a constituent of the ranges of the Southwest, and furnishes fair forage.

Fruit 4 mm long; spikelets tawny-villous ..... 1. T. INSULARIS.
Fruit 3 mm or less long (rarely 3.5 mm); spikelets white-villous.
  Spikelets long-silky, the hairs exceeding the spikelet; fruit 3–3.5 mm long.
    Panicle branches stiffly ascending or spreading, comparatively few flowered; fruit oblong-lanceolate, gradually pointed ..... 3. T. PATENS.
    Panicle branches appressed, densely flowered; fruit obovate, abruptly pointed, the point scarcely indurate ..... 2. T. CALIFORNICA.
  Spikelets short-silky, the hairs not exceeding the spikelet; fruit 2.4 mm long ..... 4. T. HITCHCOCKII.

1. Trichachne insulāris (L.) Nees. SOURGRASS. (Fig. 1155.) Culms suberect from a hard scaly hairy swollen base, 1 to 1.5 m tall; leaves numerous; the sheaths sparsely hirsute; blades elongate, 8 to 15 mm wide; panicle 15 to 30 cm long, the slender racemes mostly 10 to 15 cm long, somewhat nodding; spikelets approximate, excluding the hairs about 4 mm long, the tawny hairs much exceeding them. ♃ (*Valota insularis* Chase.)—Low open ground and waste places, Florida, Alabama (Mobile), and southern Texas; Mexico, West Indies to Argentina.

FIGURE 1154.—Distribution of *Anthaenantia villosa*.

2. Trichachne californica (Benth.) Chase. COTTONTOP. (Fig. 1156.) Culms erect from a knotty swollen felty-pubescent base, 40 to 100 cm tall; leaves numerous, the sheaths glabrous to sparsely pilose; blades mostly less than 12 cm long, 3 to 5 mm wide, from nearly glabrous to densely puberulent; panicle mostly 5 to 10 cm long, the few racemes usually 3 to 5 cm long, occasionally longer, erect or nearly so; spikelets approximate, excluding the hairs 3 to 4 mm long, the white to purplish hairs much exceeding them, often spreading, the middle internerves of the sterile lemma glabrous. ♃ (*T. saccharata* Nash.)—Plains and dry open ground, Texas to Colorado, Arizona, and Mexico (fig. 1157).

3. Trichachne pātens Swallen. (Fig. 1158.) Culms tufted, erect, 40 to 90 cm tall; sheaths more or less papillose-pilose, the lowermost densely felty pubescent; blades 5 to 15 cm long, 1 to 4 mm wide, scabrous; panicle 10 to 18 cm long, the racemes stiffly ascending or spreading; spikelets remote, 4 mm long, densely silky, the hairs exceeding the spikelet; fruit 3 mm long, acute. ♃ — Dry fields, prairies, and roadsides, Texas.

4. Trichachne hitchcóckii (Chase) Chase. (Fig. 1159.) Culms tufted and branching at base, leafy below, slender, 30 to 50 cm tall; sheaths

FIGURE 1155.—*Trichachne insularis.* Plant × ½; spikelet and floret, × 10. (Baker and Wilson 602, Cuba.)

and blades nearly glabrous to puberulent, sometimes densely so toward base, the blades 2 to 5 cm long, 2 to 3 mm wide; panicle long-exserted, 6 to 10 cm long, the few racemes 3 to 4 cm long, mostly rather remote and erect; spikelets 2.5 to 3 mm long, densely silky-villous, the prominent nerves not hidden, the grayish hairs not exceeding the spikelet. ♃ —Dry plains, Texas; northern Mexico.

121. DIGITÁRIA Heister. Crabgrass

(*Syntherisma* Walt.)

Spikelets in twos or threes, rarely solitary, subsessile or short-pediceled, alternate in two rows on one side of a 3-angled winged or wingless rachis; spikelets lanceolate or elliptic, nearly planoconvex; first glume minute or wanting; second glume equaling the sterile lemma or shorter; fertile lemma cartilaginous, the hyaline margins pale. Annual or perennial, erect to prostrate, often weedy grasses, the slender racemes digitate or approximate on a short axis. Type species, *Digitaria sanguinalis*. Name from Latin *digitus*, finger, alluding to the digitate inflorescence of the type species.

Figure 1157.—Distribution of *Trichachne californica*.

The species are in the main good forage grasses. *Digitaria sanguinalis*, the common crabgrass, is a weed in cultivated soil. In the Southern States, where it produces an abundant growth in the late summer on fields from which crops have been gathered, it is utilized for forage and is sometimes cut for hay. This species and *D. ischaemum* are common weeds in lawns. They form a fine green growth at first but they start late and die in the fall.

Figure 1156.—*Trichachne californica*, × 1. (Hitchcock 13608, Tex.)

1a. Rachis winged or flat-margined, the margin as wide as the central rib; plants annual, creeping at least at base.

Rachis bearing scattered long fine hairs (these rarely wanting); spikelets narrow, acuminate, nearly glabrous ..... 2. D. horizontalis.

Rachis not bearing hairs; spikelets elliptic, acute, pubescent.

Sheaths glabrous; fertile lemma brown.

Spikelets 2 mm long, 1 mm wide, the hairs or most of them capitellate. 3. D. ischaemum.

Spikelets 1.5 to 1.7 mm long, about 0.6 mm wide, the hairs not capitellate.

Sterile lemma with 5 distinct nerves; spikelets sparingly pubescent, 1.7 mm long; fertile lemma light brown; racemes, if more than 2, not digitate ..... 4. D. floridana.

Sterile lemma with 3 distinct nerves; spikelets distinctly pubescent, 1.5 mm long, fertile lemma dark brown, racemes usually all digitate ..... 5. D. violascens.

Sheaths pilose or villous; fertile lemma pale.

Spikelets 1.5 to 1.7 mm long; pedicels terete, glabrous ... 6. D. serotina.

Spikelets 2.5 to 3.5 mm long; pedicels angled, scabrous. 1. D. sanguinalis.

FIGURE 1158.—*Trichachne patens*. Plant, × 1; spikelet and floret, × 10. (Reed 11, Tex.)

1b. Rachis wingless or with a very narrow margin (see also *D. horizontalis*), triangular; plants not creeping (except in *D. texana*), annual or perennial.
2a. Fertile lemma pale or gray.
Plants annual, decumbent and rooting at base. Spikelets 3 mm long, glabrous or nearly so ---- 7. D. SIMPSONI.
Plants perennial.
Spikelets densely or sparsely villous; racemes 5 to 10.
Spikelets 3.5 to 4 mm long, sparsely to densely villous ---- 15. D. RUNYONI.
Spikelets 2.3 to 2.8 mm long, rather sparsely villous ---- 12. D. TEXANA.
Spikelets glabrous to obscurely appressed-pubescent on the internerves; racemes 2 to 5, some of them naked at base for 1 to 1.5 cm.
First glume broad, hyaline, minute but obvious; spikelets 3.2 mm long, glabrous ---- 13. D. PAUCIFLORA.
First glume obsolete or nearly so; spikelets 2.5 to 2.8 mm long, obscurely to obviously appressed-pubescent ---- 14. D. SUBCALVA.
2b. Fertile lemma dark brown. Plants erect or at least not rooting at the decumbent base; annual or sometimes apparently perennial.
Second glume and sterile lemma glabrous (see also *D. laeviglumis* under *D. filiformis*) ---- 11. D. GRACILLIMA.
Second glume and sterile lemma capitellate-pubescent.
Spikelets 2 to 2.5 mm long ---- 9. D. VILLOSA.
Spikelets 1.5 to 1.7 mm long.
Blades folded or involute, flexuous ---- 10. D. PANICEA.
Blades flat ---- 8. D. FILIFORMIS.

1. Digitaria sanguinális (L.) Scop. CRABGRASS. (Fig. 1160.) Plant branching and spreading, often purplish, rooting at the decumbent base, the culms sometimes as much as 1 m long, the flowering shoots prostrate or ascending; sheaths, at least the lower, papillose-pilose; blades 5 to 10 mm wide, pubescent to scaberulous; racemes few to several, 5 to 15 cm long, rarely longer, digitate, with usually 1 or 2 whorls a short distance below; spikelets about 3 mm long; first glume minute but evident; second glume about half as long as the spikelet, narrow, ciliate; sterile lemma strongly nerved, the lateral internerves appressed-pubescent, the hairs sometimes spreading at maturity (*D. fimbriata* Link); fertile lemma pale. ⊙ —Fields, gardens, and waste places, a troublesome weed in cultivated ground, throughout the United States, at low and medium altitudes, more common in the East and South; temperate and tropical regions of the world. Native of Europe. A specimen with nearly glabrous sheaths and inflorescences of 2 racemes collected by Tracy in Mississippi, said to be introduced, has been erroneously referred to *Syntherisma barbatum* (Willd.) Nash (*Digitaria barbata* Willd.).

FIGURE 1159.—*Trichachne hitchcockii*. Plant, × 1; spikelet and floret, × 10. (Type.)

2. Digitaria horizontális Willd. (Fig. 1161.) Resembling *D. sanguinalis* but the racemes more slender and lax, rachis scarcely winged, bearing scattered long fine spreading hairs (these rarely wanting); spikelets narrow, about 2 mm long; first glume minute or obsolete; second glume half as long as the spikelet. ⊙ (*Syntherisma setosum* Nash; *S. digitatum* Hitchc.)—Waste places, southern and central Florida; ballast, Mobile, Ala.; tropical regions of both hemispheres.

FIGURE 1160.—*Digitaria sanguinalis*. Plant, × ½; two views of spikelet, and floret, × 10. (Norton 566, Kans.)

3. Digitaria ischaémum (Schreb.) Muhl. SMOOTH CRABGRASS. (Fig. 1162.) Erect or usually soon decumbent-spreading, resembling *D. sanguinalis* but not so coarse or tall; foliage glabrous, more purple; racemes mostly 2 to 6, 4 to 10 cm long, the rachis with thin wings wider than the midrib; spikelets about 2 mm long; first glume hyaline, obscure; second glume and sterile lemma as long as the dark fertile lemma, pubescent with capitellate hairs. ⊙ (*Syntherisma humifusum* Rydb.)—Waste places, often a troublesome weed in lawns, Quebec to North Dakota, south to South Carolina, Tennessee, and Arkansas, occasionally farther west (fig. 1163); introduced from Eurasia. The first glume is so thin as to be apparently wanting. DIGITARIA ISCHAEMUM var. MISSISSIPPIÉNSIS (Gattinger) Fernald. Taller, the racemes mostly 5 to 7, often 10 or even 15 cm long; first glume often more easily seen. ⊙ —Maryland, Tennessee, and South Carolina.

FIGURE 1161.—*Digitaria horizontalis*. Plant, × 1; spikelet and floret, × 10. (Nash 996, Fla.)

FIGURE 1162.—*Digitaria ischaemum*. Plant, × 1; spikelet and floret, × 10. (Jones 1761, Vt.)

4. Digitaria floridána Hitchc. (Fig. 1164.) Culms tufted, decumbent at base, 20 to 30 cm tall; foliage glabrous except for a few long hairs around the mouth of the sheath; blades 4 to 7 cm long, 3 to 6 mm wide; racemes 3 or 4, rather distant on the axis, 3 to 6 cm long, the rachis wings wider than the midrib; spikelets 1.5 to 1.7 mm long, rather sparingly pubescent; first glume wanting; second glume and sterile lemma about as long as the light brown fertile lemma. ⊙ —Known only from sandy pine woods, Hernando County, Fla. The inflorescence resembles that of *D. filiformis*, but the rachis is winged; the spikelets are smaller than those of *D. ischaemum*.

5. Digitaria violáscens Link. (Fig. 1165, *B*.) Annual or apparently perennial; culms numerous in a tuft, spreading at base, slender, 10 to 40 cm tall; leaves mostly clustered near the base, the sheaths glabrous; blades flat, mostly less than 5 cm long, 3 to 6 mm

wide, the upper culm blade distant, reduced; racemes slender, 2 to 5, usually 2 or 3, digitate or sometimes approximate on a short axis 3 to 6 cm long, at maturity spreading or curved, the rachis flat, winged, about 0.7 mm wide; spikelets closely set, elliptic, acutish, minutely pubescent, about 1.5 mm long; first glume wanting; second glume about three-fourths as long as the spikelet; sterile lemma as long as the spikelet, with three distinct nerves and 1 or 2 obscure pairs; fertile lemma acute, dark brown at maturity. ⊙ 2↓ — Open pineland in sandy soil, Arkansas (Hamburg), Texas (Buna); tropical America; tropical Asia.

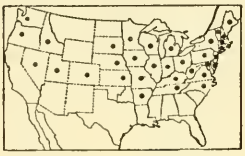

FIGURE 1163.—Distribution of *Digitaria ischaemum*.

FIGURE 1164.—*Digitaria floridana*. Plant, × 1; spikelet and fertile floret, × 10. (Type.)

FIGURE 1165.—*A*, *Digitaria serotina*. Plant, × 1; two views of spikelet and floret, × 10. (Tracy 4653, Miss.) *B*, *D. violascens*. Two views of spikelet and floret, × 10. (Hitchcock 9396, Jamaica.)

6. Digitaria serótina (Walt.) Michx. (Fig. 1165, *A*.) Creeping, sometimes forming extensive mats; flowering culms ascending or erect, 10 to 30 cm tall; leaves crowded on the creeping culms, the blades short; sheaths villous; blades 2 to 8 cm long, 3 to 7 mm wide; racemes usually 3 to 5, slender, often arcuate, 3 to 10 cm long, the rachis with thin wings wider than the midrib; spikelets pale, about 1.7 mm long; first glume wanting; second glume about one-third as long as the sterile lemma, both finely pubescent; fertile lemma pale. ⊙ —Pastures and waste places, Coastal Plain, North Carolina to Florida and Louisiana; Philadelphia (ballast); Cuba (fig. 1166).

FIGURE 1166.—Distribution of *Digitaria serotina*.

7. Digitaria simpsóni (Vasey) Fernald. (Fig. 1167.) Resembling *D. sanguinalis* in habit; sheaths papillose-pilose, those of the inno-

vations compressed-keeled; blades not more than 6 mm wide, softly pilose; racemes 4 to 8, ascending, pale, 8 to 12 cm long, the triangular rachis narrowly margined; spikelets about 3 mm long; first glume hyaline, obsolete or nearly so; second glume and sterile lemma finely 7- to 9-nerved, glabrous or very obscurely pubescent, barely exceeding the pale, slightly apiculate fertile lemma. ⊙ —Sandy fields, Florida, rare; Isla de Pinos, Cuba.

FIGURE 1167.—*Digitaria simpsoni*. Plant, × 1; spikelet and floret, × 10. (Curtiss 6422, Fla.)

8. **Digitaria filifórmis** (L.) Koel. (Fig. 1168, *A*.) Culms in small tufts, slender, usually erect, 10 to 60 cm tall, rarely taller, those of a tuft very unequal; lower sheaths pilose, the upper mostly glabrous; blades

FIGURE 1168.—*A*, *Digitaria filiformis*. Plant, × 1; spikelet and floret, × 10. (Bissell, Conn.) *B*, *D. laevigumis*. Spikelet, × 10. (Type coll.)

erect, usually 5 to 15 cm long (longer in robust plants), 1 to 4 mm wide; racemes mostly 1 to 5, unequal, erect or ascending, mostly less than 10 cm long, somewhat distant, not fascicled; spikelets 1.5 to 1.7 mm long; first glume wanting; second glume and sterile lemma pubescent with short capitellate hairs, sometimes nearly glabrous, the glume shorter than the spikelet; fertile lemma dark brown, slightly apiculate. ⊙ —Sandy fields and sterile open ground, New Hampshire to Iowa and Kansas, south to Florida, Texas. and Mexico

(fig. 1169). A form with glabrous spikelets from Manchester, N.H., has been described as *D. laeviglumis* Fernald (fig. 1168, *B*).

9. Digitaria villósa (Walt.) Pers. (Fig. 1170.) Perennial at least in the Southern States, in large tufts, purplish at base; culms 0.75 to 1.5 m tall, rarely branching; sheaths, at least the lower, grayish villous, sometimes sparsely so; blades elongate, 3 to 6 mm wide, often flexuous, from softly pilose to nearly glabrous; racemes 2 to 7, narrowly ascending, rarely somewhat spreading, very slender, usually 15 to 25 cm long, rather distant, often naked at base, sometimes interrupted; spikelets 2 to 2.5 mm long, usually densely pubescent with soft capitellate hairs, the hairs longer than in *D. filiformis*, and sometimes only obscurely capitellate, the spikelets otherwise very like those of *D. filiformis*. 2↓ —Sandy fields and woods, Maryland to Missouri, south to Florida and Texas; Cuba, Mexico (fig. 1171). This species and *D. filiformis* seem to intergrade to some extent. Plants from peninsular Florida with less strongly pubescent sheaths, 2 to 4 elongate racemes, and spikelets with longer hairs have been distinguished as *D. leucocoma* (Nash) Urban.

FIGURE 1169.—Distribution of *Digitaria filiformis*.

FIGURE 1170.—*Digitaria villosa*. Plant, × 1; spikelet and floret, × 10. (Curtiss 5300, Fla.)

10. Digitaria panícea (Swartz) Urban. (Fig. 1172.) Resembling *D. villosa*, but more slender; blades folded or involute, flexuous, about 1 mm wide; racemes mostly 1 to 3, erect, 5 to 20 cm long, usually 10 to 15 cm, very slender, loosely flowered; spikelets about 1.5 mm long, the capitellate hairs rather stiff and appressed. 2↓ —Moist pine barrens and open ground, southern Florida; West Indies, Brazil.

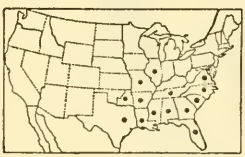

FIGURE 1171.—Distribution of *Digitaria villosa*.

FIGURE 1172.—*Digitaria panicea*. Plant, × 1; spikelet and floret, × 10. (Tracy 9058, Fla.)

11. Digitaria gracíllima (Scribn.) Fernald. (Fig. 1173.) Perennial in dense tufts; culms 60 to 100 cm tall, erect; lower sheaths appressed-villous; blades elongate, 1 to 2 mm wide, often involute, more or less flexuous; racemes mostly 2 or 3, distant (rarely as many as 5 and fairly approximate), very slender; spikelets rather remote,

relatively long pediceled, about 2.3 mm long, glabrous; first glume obsolete, the second glume one-fourth to one-half as long as the dark brown fertile lemma; sterile lemma scarcely equaling the fruit. ♃ —Sandy soil, high pineland, peninsular Florida, rare. A tall plant from Grasmere with 3 to 5 racemes, the spikelets having second glumes about two-thirds as long as the fertile lemma, has been differentiated as *D. bakeri* (Nash) Fernald.

12. Digitaria texána Hitchc. (Fig. 1174.) Perennial, erect or somewhat decumbent and branching at base; culms 30 to 60 cm tall; lower sheaths, rarely all the sheaths, villous or velvety-pubescent, the uppermost glabrous; ligule prominent; blades flat, the lower villous, the upper glabrate, 10 to 15 cm long, 3 to 5 mm wide; racemes mostly 5 to 10, slender, pale, ascending or erect, 5 to 12 cm long, the axis 1 to 4 cm long; rachis angled,

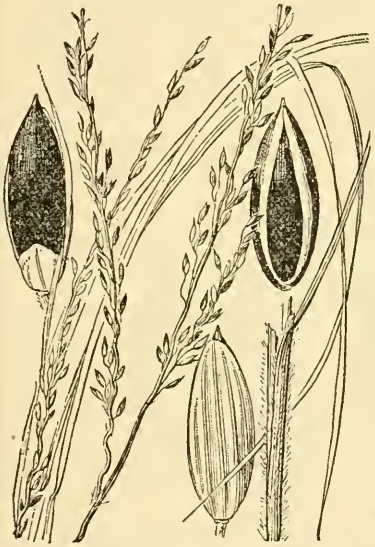

FIGURE 1173.—*Digitaria gracillima.* Plant, × 1; two views of spikelet, and floret, × 10. (Type.)

FIGURE 1174.—*Digitaria texana.* Plant, × 1; spikelet and floret, × 10. (Type.)

the scabrous margins much narrower than the whitish center; spikelets mostly rather distant, 2 to 2.5 mm long, from short-villous to nearly glabrous, the silky hairs not at all capitellate; first glume obsolete; second glume and sterile lemma as long as the pale acute fertile lemma. ♃ —Sandy oak woods or sandy prairie, southern Texas.

13. Digitaria pauciflóra Hitchc. (Fig. 1175.) Perennial; culms erect or somewhat decumbent at base, 0.5 to 1 m tall, very slender, sparingly branching; foliage grayish-villous, the blades 6 to 12 cm

long, about 2 mm wide; racemes 2 or 3, ascending or erect, 5 to 11 cm long, the filiform rachis naked for 1 to 1.5 cm at base, or with distant abortive spikelets; spikelets rather distant, elliptic, about 3.2 mm long, glabrous; first glume minute with a hyaline erose margin; second glume and sterile lemma finely nerved, as long as the grayish fertile lemma. 2↓ —Pinelands, southern Florida.

14. Digitaria subcálva Hitchc. (Fig. 1176.) Perennial; culms tufted, slender, ascending from a curved base, 40 to 100 cm tall; sheaths papillose-pilose; blades flat, scabrous, the lower pilose, 3 to

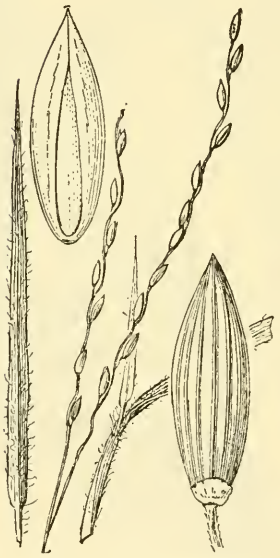

FIGURE 1175.—*Digitaria pauciflora.* Plant, × 1; spikelet and floret, × 10. (Type.)

FIGURE 1176.—*Digitaria subcalva.* Plant, × 1; spikelet and floret, × 10. (Type.)

15 cm long 1 to 3 mm wide; racemes 2 to 4, narrowly ascending, 5 to 12 cm long, approximate, the rachis slender, triangular, mostly naked at base for 1 to 1.5 cm; spikelets 2.5 to 2.8 mm long, acute; first glume obsolete; second glume and sterile lemma slightly shorter than the acute pale or drab fruit, the internerves from obscurely to distinctly appressed silky-pubescent. 2↓ —Known only from Plant City, Fla.

15. Digitaria runyóni Hitchc. (Fig. 1177.) Perennial; culms ascending, 40 to 70 cm tall, the base often long-creeping and rooting, many-noded; sheaths densely villous or the upper glabrate; blades flat, the lower densely velvety-villous, the upper sparingly pilose or glabrous, mostly less than 10 cm long, 3 to 6 mm wide; racemes 5 to 10,

on an axis 1 to 4 cm long, mostly suberect, 7 to 12 cm long, pale, sometimes naked at base, the rachis flat-triangular; spikelets narrowly lanceolate, acute, 2.8 to 3.5 mm long; first glume minute or obsolete; second glume and sterile lemma equal, sparsely to densely villous on the internerves, the lemma glabrous on the middle internerves; fertile lemma acuminate, usually a little shorter than the spikelet, pale at maturity. 2↓ —Sand dunes and sandy prairies along the coast, southern Texas.

122. LEPTOLÓMA Chase

Spikelets on slender pedicels; first glume minute or obsolete; second glume 3-nerved, nearly as long as the 5- to 7-nerved sterile lemma, a more or less prominent stripe of appressed silky hairs down the internerves and margins of each, the sterile lemma empty or enclosing a minute nerveless rudimentary palea; fertile lemma cartilaginous, elliptic, acute, brown, the delicate hyaline margins enclosing the palea. Branching perennials with brittle culms, felty pubescent at base, flat blades, and open or diffuse panicles, these breaking away at maturity, becoming tumbleweeds. Type species, *Leptoloma cognatum*. Name from Greek *leptos*, thin and *loma*, border, alluding to the thin margins of the lemma.

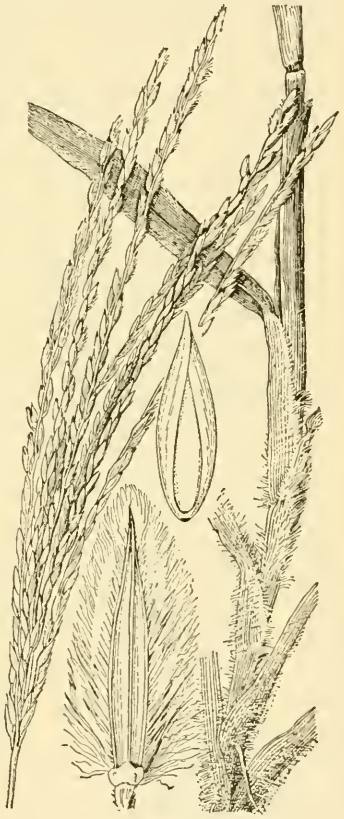

FIGURE 1177.—*Digitaria runyoni*. Plant, × 1; spikelet and floret, × 10. (Type.)

1. Leptoloma cognátum (Schult.) Chase. FALL WITCHGRASS. (Fig. 1178.) Ascending from a decumbent base, often forming large bunches, pale green, leafy; culms 30 to 70 cm long; blades mostly less than 10 cm long, 2 to 6 mm wide, rather rigid; panicle one-third to half the entire height of the plant, purplish and short-exserted at maturity, very diffuse, the capillary branches soon widely spreading, pilose in the axils, the spikelets solitary on long capillary pedicels, narrowly elliptic, 2.5 to 3 mm long, abruptly acuminate. 2↓ (*Panicum cognatum* Schult., *Panicum autumnale* Bosc.)—Dry soil and sandy fields, New Hampshire to Minnesota, south to Florida and Texas, west to Arizona (fig. 1179). A fairly palatable grass.

123. STENOTÁPHRUM Trin.

Spikelets embedded in one side of an enlarged and flattened corky rachis tardily disarticulating toward the tip at maturity, the spikelets remaining attached to the joints; first glume small; second glume and sterile lemma about equal, the latter with a palea or staminate

FIGURE 1178.—*Leptoloma cognatum.* Plant, × ½; two views of spikelet, and floret, × 10. (Tracy 8223, Tex.)

flower; fertile lemma chartaceous. Creeping stoloniferous perennials, with short flowering culms, rather broad and short obtuse blades, and terminal and axillary racemes. Type species, *Stenotaphrum glabrum* Trin. Name from Greek, *stenos*, narrow, and *taphros*, trench, referring to the cavities in the rachis.

FIGURE 1179.—Distribution of *Leptoloma cognatum*

1. Stenotaphrum secundátum (Walt.) Kuntze. ST. AUGUSTINE GRASS. (Fig. 1180.) Culms branching, compressed, the flowering shoots 10 to 30 cm tall; blades mostly less than 15 cm long, longer on the innovations, in rich soil 4 to 10 mm wide; racemes 5 to 10 cm long; spikelets solitary or in pairs, rarely threes, 4 to 5 mm long. 2l — Moist, especially mucky soil, mostly near the seashore, South

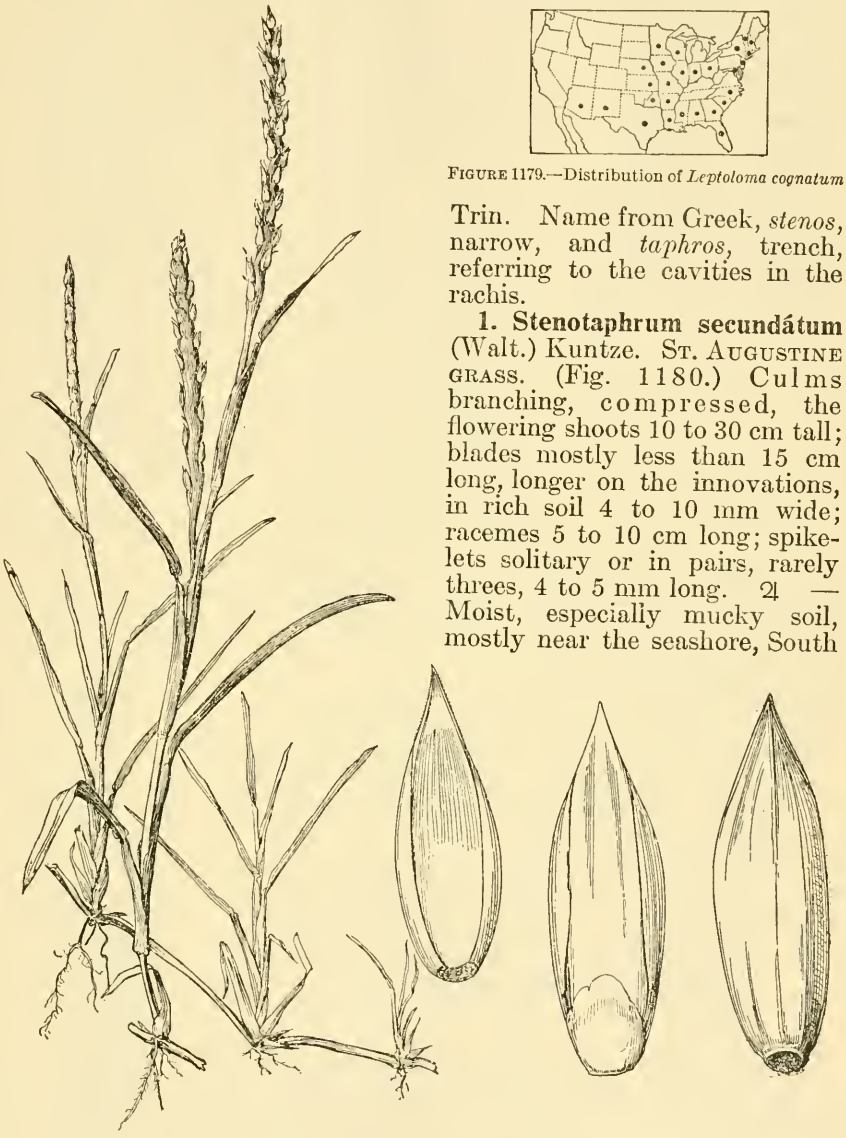

FIGURE 1180.—*Stenotaphrum secundatum*. Plant, × ½; two views of spikelet, and fertile floret, × 10. (Tracy 1408, Miss.)

Carolina to Florida and Texas (fig. 1181). Cultivated as a lawn grass in the coastal cities. The lawns have a coarse texture but are otherwise satisfactory. Propagated by cuttings of the stolons. A variegated form with leaves striped with white is used as a basket plant. Called by gardeners var. *variegatum*.

124. ERIÓCHLOA H.B.K. Cupgrass

Spikelets more or less pubescent, solitary or sometimes in pairs, short-pediceled or subsessile, in two rows on one side of a narrow rachis, the back of the fertile lemma turned from the rachis; lower rachilla joint thickened, forming a more or less ringlike, usually dark-colored callus below the second glume, the first glume reduced to a minute sheath about this and adnate to it; second glume and sterile lemma about equal, the lemma usually enclosing a hyaline palea or sometimes a staminate flower; fertile lemma indurate, minutely papillose-rugose, mucronate or awned, the awn often readily deciduous, the margins slightly inrolled. Annual or perennial, often branching grasses, with terminal panicles of several to many spreading or appressed racemes, usually approximate along a common axis. The species are called cupgrasses because of the tiny cup made by the first glume at the base of the spikelet. Type species, *Eriochloa distachya* H.B.K. Name from Greek *erion*, wool, and *chloa*, grass, alluding to the pubescent spikelets and pedicels.

FIGURE 1181.—Distribution of *Stenotaphrum secundatum*.

A West Indian species, *E. polystchaya* H.B.K. (*E. subglabra* (Nash) Hitchc.), called malojilla in Puerto Rico, is used for forage. This has been tried along the Gulf Coast from Florida to southern Texas and has given excellent results in southern Florida and at Biloxi, Miss. It is similar in habit to Para grass, producing runners but less extensively, is suited to grazing, and will furnish a good quality of hay. It will not withstand either cold or drought. The name carib grass has been proposed for it. In Arizona *E. gracilis* has some value for forage in the national forests.

Spikelets, including slender awns, 7 to 10 mm long---------- 1. E. ARISTATA.
Spikelets not more than 6 mm, awnless or awn-tipped.
  Pedicels with erect hairs at least half as long as the spikelet; racemes dense, erect or appressed. (See also *E. gracilis* var. *minor*.)
    Blades 2 to 3 mm wide, elongate---------- 2. E. SERICEA.
    Blades 5 to 15 mm wide, not more than 15 cm long------- 3. E. LEMMONI.
  Pedicels scabrous or short-pubescent.
    Plants perennial.
      Rachis velvety to villous; spikelets narrowly ovate---- 8. E. MICHAUXII.
      Rachis scabrous only; spikelets lanceolate---------- 7. E. PUNCTATA.
    Plants annual.
      Rachis scabrous only; racemes slender. Introduced---- 4. E. PROCERA.
      Rachis pubescent; racemes stouter.
        Blades glabrous; fruit apiculate---------- 5. E. GRACILIS.
        Blades pubescent; fruit with an awn about 1 mm long. 6. E. CONTRACTA.

1. Eriochloa aristáta Vasey. (Fig. 1182.) Annual; culms erect or spreading at base, 50 to 80 cm tall; blades flat, mostly 10 to 12 mm wide, glabrous; racemes several, ascending, overlapping, 3 to 4 cm long, the rachis pilose, the pedicels bearing several long stiff hairs; spikelets about 5 mm long, the glume and sterile lemma tapering into awns (awn of the glume about as long as the spikelet), appressed-villous on the lower half or two-thirds, the upper part scaberulous only; fruit 3.5 mm long, apiculate. ⊙ —Open ground, Arizona (Tucson) and California (Fort Yuma); northern Mexico.

2. Eriochloa serícea (Scheele) Munro. (Fig. 1183.) Perennial, in dense tufts; culms simple, erect, 50 to 100 cm tall, the lowermost sheaths felty-pubescent; blades elongate, 2 to 3 mm wide, flat or mostly involute, densely puberulent at the junction with the sheath; racemes several, appressed, somewhat distant, usually not overlapping, mostly 1.5 to 3 cm long, the rachis hirsute, the pedicels with copious stiff hairs half as long as the spikelet; spikelets 4 mm long, rather turgid, short-villous, the glume and sterile lemma acutish; fruit 3 mm long, apiculate. ♃ —Prairies and hills, Texas and Oklahoma.

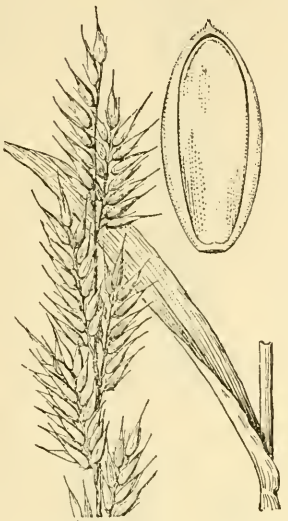

FIGURE 1182.—*Eriochloa aristata*. Plant, × ½; floret, × 10. (Thornber 98, Ariz.)

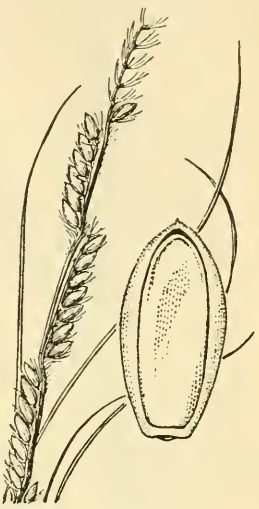

FIGURE 1183.—*Eriochloa sericea*. Plant, × 1; floret, × 10. (Reverchon 1170, Tex.)

3. Eriochloa lemmóni Vasey and Scribn. (Fig. 1184.) Annual; culms decumbent at base, 30 to 60 cm tall; blades flat, only the larger as much as 15 cm long, 5 to 15 mm wide, velvety-pubescent on both surfaces; racemes erect, the upper overlapping, 1.5 to 3 cm long, the axis and rachis densely villous, the pedicels with several long hairs; spikelets 4 mm long, rather turgid, villous except the apex, abruptly narrowed to a short obtuse point; fruit 3 mm long, slightly apiculate. ⊙ —Canyons, southern Arizona and northern Mexico.

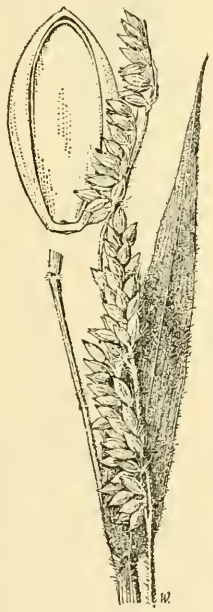

FIGURE 1184.—*Eriochloa lemmoni*. Plant, × 1; floret, × 10. (Peebles and Harrison 4703, Ariz.)

4. Eriochloa prócera (Retz.) Hubbard. (Fig. 1185.) Annual; culms spreading at base, 40 to 60 cm tall; blades flat, 2 to 4 mm wide; racemes loose, slender, ascending, 3 to 5 cm long, the rachis scabrous only; spikelets 3 to 3.5 mm long, appressed-pubescent, except toward the tip, the glume and sterile lemma acuminate; fruit 2 mm long, the slender awn about 0.5 mm long. ⊙ (*E. ramosa* Kuntze.)—Introduced on the university campus at Tuscon, Ariz.; Cuba; tropical Asia.

FIGURE 1185.—*Eriochloa procera*, × 10. (Griffiths 1516, Ariz.)

5. Eriochloa grácilis (Fourn.) Hitchc. (Fig. 1186, *A*.) Annual; culms erect or decumbent at base, 40 to 100 cm tall; blades flat, gla-

FIGURE 1186.—*A, Eriochloa gracilis.* Plant, × ½; two views of spikelet, and floret, × 10. (McDougal, Ariz.) *B, E. contracta.* Panicle, × 1; floret, × 10. (Hitchcock 13420, Tex.)

brous, mostly 5 to 10 mm wide; racemes several to numerous, approximate, ascending to slightly spreading, 2 to 4 cm long, the axis and rachis softly pubescent, the pedicels short-pilose; spikelets 4 to 5 mm long, rather sparsely appressed-pubescent, acuminate, or the glume sometimes tapering into an awn-point as much as 1 mm long; sterile lemma empty; fruit about 3 mm long, apiculate. ⊙ — Open ground, often a weed in fields, western Texas to southern California, south through the highlands of Mexico (fig. 1187). (This species has been referred to *E. acuminata* (Presl) Kunth, an unidentified species of Mexico.)

FIGURE 1187.—Distribution of *Eriochloa gracilis*.

FIGURE 1188.—Distribution of *Eriochloa contracta*.

ERIOCHLOA GRACILIS var. MÍNOR (Vasey) Hitchc. Mostly smaller, with more crowded, less acuminate spikelets, the pedicels with a few long hairs at the summit, fertile lemma about as long as the glume and sterile lemma (excluding the short points), obtuse or slightly apiculate. ⊙ —Open ground, Texas, New Mexico, and Arizona.

6. Eriochloa contrácta Hitchc. PRAIRIE CUPGRASS. (Fig. 1186, *B*.) Annual; culms erect or sometimes decumbent at base, pubescent at least about the nodes, 30 to 70 cm tall; blades pubescent, usually not more than 5 mm wide; panicle usually less than 15 cm long, contracted, cylindric, the racemes appressed, closely overlapping, 1 to 2 cm long, the axis and rachises villous; spikelets 3.5 to 4 mm long, excluding the awn-tip, appressed-villous; glume awn-tipped; sterile lemma slightly shorter, acuminate, empty; fruit 2 to 2.5 mm long, with an awn nearly 1 mm long. ⊙ —Open ground, ditches, low fields, and wet places, Kansas to Louisiana and New Mexico; introduced in Missouri and Virginia (fig. 1188). Differing from *E. gracilis* in the pubescent foliage, subcylindric panicle, and the awned fruit.

FIGURE 1189.—*Eriochloa punctata*. Panicle, × 1; floret, × 10. (Hitchcock 9661, Jamaica.)

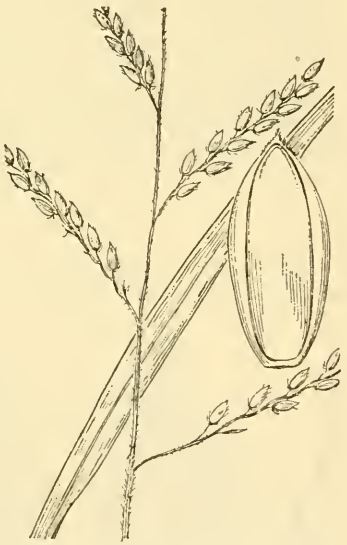

FIGURE 1190.—*Eriochloa michauxii*. Plant, × 1; floret, × 10. (Amer. Gr. Nat. Herb. 297, Fla.)

7. Eriochloa punctáta (L.) Desv. (Fig. 1189.) Perennial; culms in tufts, usually 50 to 100 cm tall; blades flat, mostly 5 to 10 mm wide,

glabrous; racemes several, ascending, overlapping, 3 to 5 cm long, the axis, rachises, and pedicels scabrous only; spikelets 4 to 5 mm long, lanceolate, rather sparsely appressed-pilose; glume tapering to an awn-point about 1 mm long; sterile lemma a little shorter than the glume, empty; fruit about half as long as the glume, awned, the awn 1 mm long or more. 2l —Marshes, river banks, and moist ground, southwestern Louisiana and southern Texas.

8. Eriochloa michaúxii (Roem. and Schult.) Hitchc. (Fig. 1190.) Perennial; culms erect, rather stout, 60 to 120 cm tall; blades flat or, on the innovations, sometimes involute, elongate, 2 to 14 mm wide, usually less than 1 cm, glabrous; racemes ascending or spreading, usually numerous, 3 to 5 or even to 15 cm long, the axis 15 to 30 cm long, this and the rachises densely velvety-pubescent; spikelets narrowly ovate, 4 to 5 mm long, appressed-villous, acute; sterile floret usually with a well-developed palea and stamens; fruit 3 to 4 mm long, hirsutulous at apex, apiculate or with an awn not more than 0.3 mm long. 2l (*E. mollis* Kunth.)—Brackish or fresh meadows and marshes and sandy prairies, southeastern Georgia and Florida. A form with narrow blades and relatively few racemes, the axis and rachis puberulent, has been described as *E. mollis* var. *longifolia* Vasey. It grades into the typical form with broader blades and more numerous racemes; the sterile floret contains a staminate flower.

ERIOCHLOA MICHAUXII var. SIMPSÓNI Hitchc. Resembling the narrow-leaved form of the species; racemes few, appressed; sterile lemma empty. 2l —Moist places, Myers to Cape Sable, Fla.

Eriochloa nelsóni Scribn. and Smith. Tall annual with puberulent blades, few spreading racemes, the rachis very woolly, and rather blunt, turgid pubescent spikelets about 5 mm long. ⊙ —Ballast, near Portland, Oreg., Jalisco, Mex., to Nicaragua.

125. BRACHIÁRIA (Trin.) Griseb.

Spikelets solitary, rarely in pairs, subsessile, in two rows on one side of a 3-angled, sometimes narrowly winged rachis, the first glume turned toward the rachis; first glume short to nearly as long as the spikelet; second glume and sterile lemma about equal, 5- to 7-nerved, the lemma enclosing a hyaline palea and sometimes a staminate flower; fertile lemma indurate, usually papillose-rugose, the margins inrolled, the apex rarely mucronate or bearing a short awn. Branching and spreading annuals or perennials, with linear blades and several spreading or appressed racemes approximate along a common axis. Type species, *Brachiaria erucaeformis*. Name from Latin *brachium*, arm, alluding to the armlike racemes.

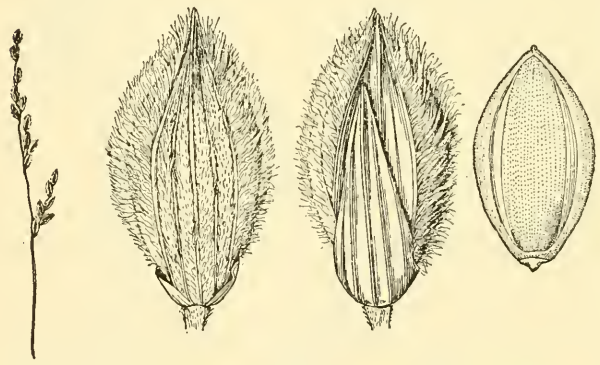

FIGURE 1191.—*Brachiaria ciliatissima*. Panicle, × 1; two views of spikelet, and floret, × 10. (Type.)

Spikelets densely silky-pubescent; plants perennial------- 1. B. CILIATISSIMA.
Spikelets glabrous; plants annual.
Spikelet flat-beaked beyond the fruit---------- 2. B. EXTENSA.
Spikelet not beaked beyond the fruit---------- 3. B. PLANTAGINEA.

1. Brachiaria ciliatíssima (Buckl.) Chase. (Fig. 1191.) Perennial, producing long leafy stolons with short internodes, rooting at the swollen nodes, the blades short, firm, divaricately spreading; flowering culms erect or ascending, 15 to 40 cm tall, the nodes bearded; sheaths sparsely to densely pilose; blades 3 to 7 cm long, 3 to 5 mm wide, tapering to a sharp point, usually ciliate along the lower part of the thick white margin; panicle finally long-exserted, 3 to 6 cm long, the few branches erect or ascending, 1 to 2 cm long; spikelets 4 mm long first glume three-fourths the length of the spikelet, glabrous; second glume and

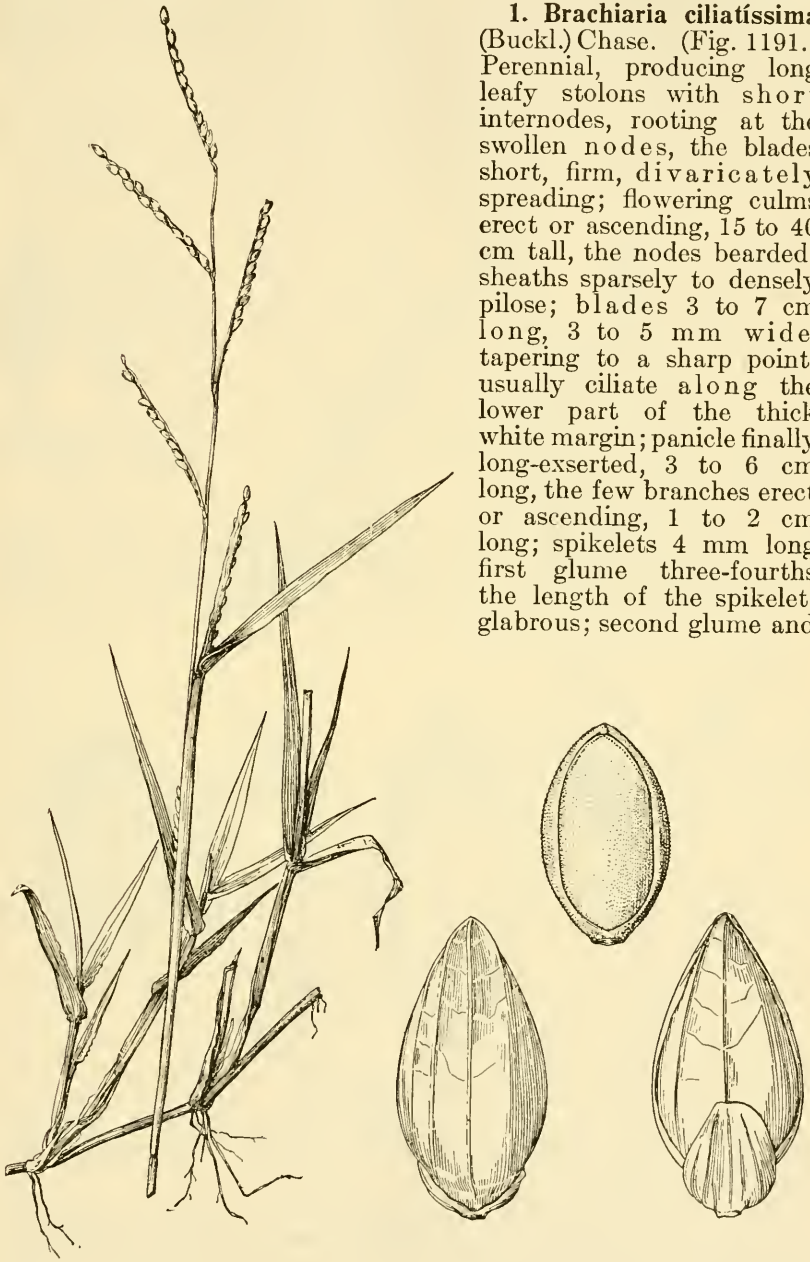

FIGURE 1192.—*Brachiaria extensa.* Plant, × ½; two views of spikelet, and floret, × 10. (Nealley, Tex.)

sterile lemma about equal, 5-nerved, the marginal part densely white-silky; fruit 3 mm long. ♃ —Open sandy ground, Texas; Arkansas (Benton County).

2. Brachiaria exténsa Chase. (Fig. 1192.) Annual; culms decumbent, rooting at the lower nodes; blades rather thick, 4 to 12 cm long, 6 to 12 mm wide; panicle short-exserted or included at base; racemes 2 to 6, distant, 3 to 8 cm long, ascending or spreading, the rachis winged, 2 mm wide; spikelets ovate, 4 to 4.5 mm long, about 2 mm wide; first glume scarcely one-third the length of the spikelet, blunt; second glume and sterile lemma equal, exceeding the fruit and forming a flat beak beyond it, 3- to 5-nerved, with transverse veinlets toward the summit; fruit 3 mm long, elliptic, papillose-roughened. ⊙ (*B. platyphylla* Nash.)—Low, sandy, open ground, Florida; southern Louisiana, Texas, and Oklahoma; Cuba (fig. 1193).

FIGURE 1193.—Distribution of *Brachiaria extensa.*

FIGURE 1195.—*Brachiaria erucaeformis.* Panicle, × 1; two views of spikelet, and floret, × 10. (Cult.)

3. Brachiaria plantagínea (Link) Hitchc. (Fig. 1194.) Resembling *B. extensa,* more widely creeping, usually taller, blades commonly wider; rachis 1 to 1.5 mm wide, the margins infolded; first glume strongly clasping; transverse veinlets wanting or obscure on the second glume and sterile lemma, these not pointed beyond the fruit. ⊙ —Open, mostly moist, ground, Metcalf, Ga.; ballast, Philadelphia, Pa., and Camden, N.J.; Mexico to Bolivia and Brazil.

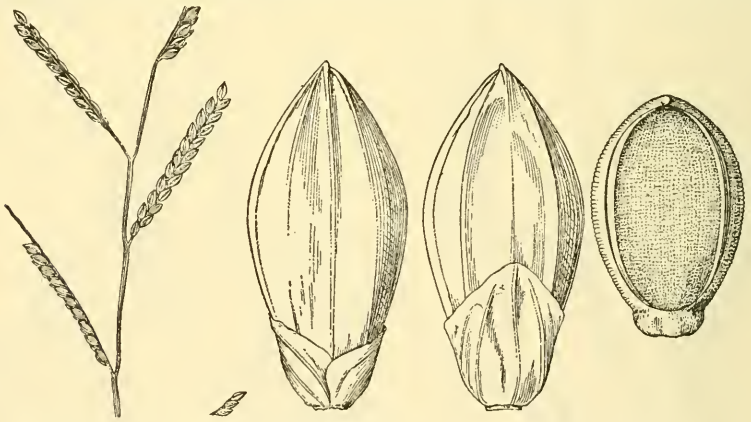

FIGURE 1194.—*Brachiaria plantaginea.* Panicle, × 1; two views of spikelet, and floret, × 10. (Pringle 3904, Mex.)

Brachiaria erucaefórmis (J. E. Smith) Griseb. (Fig. 1195.) Spreading annual with rather delicate erect racemes and pubescent spikelets 2.5 mm long. ⊙ —Has been cultivated in grass gardens, occasionally escaped. Old World.

126. AXÓNOPUS Beauv.

Spikelets depressed-biconvex, not turgid, oblong, usually obtuse, solitary, subsessile, and alternate, in two rows on one side of a 3-angled rachis, the back of the fertile lemma turned from the axis; first glume wanting; second glume and sterile lemma equal, the lemma without a palea; fertile lemma and palea indurate, the lemma oblong-elliptic, usually obtuse, the margins slightly inrolled. Stoloniferous or tufted perennials, rarely annuals, with usually flat or folded, abruptly rounded or somewhat pointed blades, and few or numerous, slender spikelike racemes, digitate or racemose along the main axis. Type

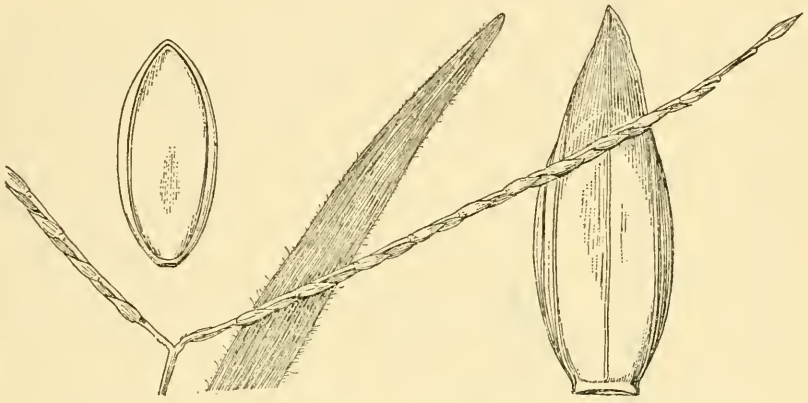

FIGURE 1196.—*Axonopus furcatus*. Plant, × 1; spikelet and floret, × 10. (Combs 1205, Fla.)

species, *Axonopus compressus*. Name from Greek *axon*, axis, and *pous*, foot.

One of the species, *A. compressus*, is a predominant pasture grass in the alluvial or mucky soil of the southern Coastal Plain. It is of little importance on sandy soil and does not thrive on the uplands. This species is also used as a lawn grass, for which purpose it is propagated by setting out pieces of the stolons.

Spikelets 4 to 5 mm long, glabrous; midnerve of glume and sterile lemma evident ..... 1. A. FURCATUS.
Spikelets about 2 mm long, sparsely appressed-silky; midnerve of glume and sterile lemma suppressed ..... 2. A. COMPRESSUS.

1. Axonopus furcátus (Flügge) Hitchc. (Fig. 1196.) Plants stoloniferous; culms compressed, tufted, erect, or decumbent at base, 40 to 100 cm tall; blades flat, mostly 5 to 10 mm wide, glabrous, ciliate, or even hirsute; racemes 2, digitate, rarely a third below, spreading, 5 to 10 cm long; spikelets 4 to 5 mm long (rarely less), glabrous, acute, glume and sterile lemma 5-nerved; fruit about two-thirds as long as the spikelet. ♃ —Marshes, river banks, and moist pine barrens, on the Coastal Plain, southeastern Virginia to Florida, Texas, and Arkansas (fig. 1197). (The name *Anastrophus paspaloides* has been misapplied to this species. *Digitaria paspalodes* Michx., upon which it is based, is *Paspalum distichum* L.)

FIGURE 1197.—Distribution of *Axonopus furcatus*.

2. Axonopus compréssus (Swartz) Beauv. CARPET GRASS. (Fig. 1198.) Plants stoloniferous, the blades of the stolons often broader and shorter than those of the culm; flowering culms erect or ascend-

FIGURE 1198.—*Axonopus compressus.* Plant, × ½; two views of spikelet, and floret, × 10. (Combs 413, Fla.)

ing, compressed, usually 20 to 60 cm tall; blades flat, or folded in drying, 2 to 10 mm (commonly 4 to 8 mm) wide, usually ciliate, at least near the base; peduncles terminal and axillary, very slender,

ong-exserted; racemes usually 3, a pair at the summit and 1 rarely 2 or even 3 below, usually a pair only on axillary peduncles, slender, ascending, 3 to 10 cm long; spikelets about 2 mm long, pale; glume and sterile lemma equaling the fruit or pointed beyond it, sparsely appressed-silky near the margin, 2 or 4 nerved, the nerves close to the margin, the midnerve suppressed. 2↓ (*Anastrophus compressus* Schlecht.; *Anastrophus platycaulis* Nash.)—Moist sandy or mucky soil, Coastal Plain, North Carolina to Florida, Texas, and Arkansas; tropical America (fig. 1199); introduced in tropical parts of the Old World.

127. REIMARÓCHLOA Hitchc.

Spikelets strongly dorsally compressed, lanceolate, acuminate, rather distant, subsessile, and alternate in two rows along one side of a narrow, flattened rachis, the back of the fertile lemma turned toward it; both glumes wanting, or the second sometimes present in the terminal spikelet; sterile lemma about equaling the fruit, the sterile palea obsolete; fertile lemma scarcely indurate, faintly nerved, acuminate, the margins inrolled at the base only, the palea free nearly half its length. Spreading or stoloniferous perennials, with flat blades and slender racemes, these subdigitate or racemose along a short axis, stiffly spreading or reflexed at maturity. Type species, *Reimaria acuta* Flügge (*Reimarochloa acuta* Hitchc.). Named for J.A.H. Reimarus, and Greek *chloa*, grass.

FIGURE 1199.—Distribution of *Axonopus compressus*.

1. Reimarochloa oligostáchya (Munro) Hitchc. (Fig. 1200.) Glabrous; culms compressed, often long-decumbent and rooting at the lower nodes, the flowering shoots, 20 to 40 cm tall; sheaths loose; blades 2 to 4 mm wide; racemes 1 to 4, mostly 2 or 3, 5 to 8 cm long; spikelets about 5 mm long. 2↓ (*Reimaria oligostachya* Munro.)—In water or wet soil, Florida; Cuba. In general aspect resembles *Paspalum vaginatum* Swartz.

128. PÁSPALUM L.

Spikelets planoconvex, usually obtuse, subsessile, solitary or in pairs, in two rows on one side of a narrow or dilated rachis, the back of the fertile lemma toward it; first glume usually wanting; second glume and sterile lemma commonly about equal, the former rarely wanting; fertile lemma usually obtuse, chartaceous-indurate, the margins inrolled. Perennials in the United States (except *P. boscianum*), with one to many spikelike racemes, solitary, paired, or several to many on a common axis. Type species, *Paspalum dissectum*. Name from Greek *paspalos*, a kind of millet.

Several species inhabiting meadows and savannas furnish considerable forage. *Paspalum dilatatum* is valuable for pasture, especially for dairy cattle in the Southern States, where it has been cultivated under the name water grass and recently Dallis grass. In the Hawaiian Islands, Australia, and some other countries, where it is called paspalum or paspalum grass, it is valuable as a pasture grass. *P. pubiflorum* var. *glabrum* is rather abundant in some regions and is considered a good forage grass. Vasey grass, *P. urvillei*, is used to

a limited extent for hay and, when young, for pasture; the panicles also make excellent whisk brooms for brushing lint. In the Southern

FIGURE 1200.—*Reimarochloa oligostachya*. Plant, × 1; two views of spikelet, and floret, × 10. (Curtiss 3596A, Fla.)

States (Virginia to Florida and even to California) *P. distichum*, because of its extensively creeping stolons, is useful for holding banks of streams and ditches.

1a. Rachis foliaceous, broad and winged.
Racemes falling from the axis, rachis extending beyond the uppermost spikelet---- 3. P. REPENS.
Racemes persistent on the axis; rachis with a spikelet at the apex.
Spikelets 2 mm long, obovate-oval---- 1. P. DISSECTUM.
Spikelets more than 3 mm long, pointed---- 2. P. ACUMINATUM.
1b. Rachis not foliaceous nor winged (slightly winged in *P. boscianum*).
2a. Racemes 2, conjugate or nearly so at the summit of the culm, rarely a third below.
Spikelets elliptic to narrowly ovate.
Plants with creeping rhizomes or stolons.
Second glume and sterile lemma glabrous; spikelets flattened. 4. P. VAGINATUM.
Second glume pubescent; spikelets relatively turgid- 5. P. DISTICHUM.
Plants in dense tufts, without creeping rhizomes---- 11. P. ALMUM.
Spikelets suborbicular, broadly ovate or obovate.
Spikelets concavo-convex, sparsely long-silky around the margin; plant stoloniferous---- 28. P. CONJUGATUM.
Spikelets plano-convex, not silky-margined; plants not stoloniferous.
Spikelets 2.5 to 3 mm long---- 9. P. NOTATUM.
Spikelets less than 2.5 mm long---- 10. P. MINUS.
2b. Racemes 1 to many, racemose on the axis, not conjugate.
3a. First glume developed on at least one of the pair of spikelets (often obsolete in some pairs in nos. 22 and 23).
Spikelets turgidly biconvex----42. P. BIFIDUM.
Spikelets plano-convex.
Plants without rhizomes; culms tufted; spikelets pubescent. 24. P. LANGEI.
Plants with stout scaly rhizomes, the culms mostly solitary; spikelets glabrous.
Blades flat, 8 to 15 mm wide---- 22. P. UNISPICATUM.
Blades folded at base, terete above, not more than 2 mm wide. 23. P. MONOSTACHYUM.
3b. First glume normally wanting (occasionally developed on 1 to few spikelets in a raceme).
4a. Racemes terminal and axillary, the axillary sometimes hidden in the sheaths; terminal inflorescence of 1 to 3, rarely to 6 racemes (see also *P. unispicatum* and *P. monostachyum*).
5a. Spikelets not more than 1.8 mm long (or sometimes 1.9 in *P. debile* and *P. propinquum*), usually 1.5 to 1.7 mm (see also exceptional *P. ciliatifolium*).
Blades conspicuously ciliate, otherwise nearly glabrous.
Blades relatively short, rounded at base and recurved-ascending; foliage aggregate toward the base, the upper culm relatively naked; spikelets glabrous, mostly 1.5 to 1.6 mm long. 12. P. LONGEPEDUNCULATUM.
Blades mostly elongate, suberect, not aggregate toward the base; spikelets pubescent, 1.7 to 1.9 mm long-- 20. P. PROPINQUUM.
Blades and sheaths conspicuously pubescent throughout.
Culms slender, erect or suberect; foliage not aggregate at base; blades suberect, usually not more than 5 mm wide. 13. P. SETACEUM.
Culms stouter, mostly spreading; foliage more or less aggregate at base; blades spreading, usually more than 5 mm wide. 14. P. DEBILE.
5b. Spikelets 2 to 2.5 mm long (or 1.8 to 1.9 mm in *P. ciliatifolium* and *P. propinquum*).
Foliage, except margins, glabrous as a whole or nearly so (sparsely pubescent in exceptional *P. ciliatifolium* and lower sheaths usually pubescent in *P. rigidifolium*).
Blades stiff, usually not more than 6 mm wide; spikelets mostly 2.2 to 2.4 mm long---- 21. P. RIGIDIFOLIUM.
Blades from lax to rather firm, if firm more than 6 mm wide; spikelets not more than 2.1 mm long.
Spikelets mostly 2 mm long, rounded at summit; blades mostly more than 8 mm wide---- 19. P. CILIATIFOLIUM.

Spikelets 1.8 to 1.9 mm long, slightly pointed; blades not more than 8 mm wide---------- 20. P. PROPINQUUM.
Foliage conspicuously pubescent (or sparsely so in exceptional specimens of *P. pubescens*).
Culms erect or nearly so.
Blades from sparsely to rather densely pilose, rather thin. 18. P. PUBESCENS.
Blades puberulent on both surfaces with long hairs intermixed or the lower surface nearly or quite glabrous except for a few long hairs along midrib and margin, usually rather firm. 17. P. STRAMINEUM.
Culms widely spreading or prostrate.
Foliage coarsely hirsute; plants commonly relatively stout. 15. P. SUPINUM.
Foliage finely puberulent; plants usually grayish olivaceous. 16. P. PSAMMOPHILUM.

4b. Racemes terminal on the primary culm or leafy branches, no truly axillary racemes.
6a. Spikelets conspicuously silky-ciliate around the margin, the hairs as long as the spikelet or longer.
Racemes commonly 3 to 5; culms geniculate at base. 29. P. DILATATUM.
Racemes commonly 12 to 18; culms erect---------- 30. P. URVILLEI.
6b. Spikelets not ciliate.
7a. Fruit dark brown and shining.
Plants perennial; sterile lemma wrinkled---- 40. P. PLICATULUM.
Plants annual; sterile lemma not wrinkled--- 41. P. BOSCIANUM.
7b. Fruit pale to stramineous (brown but not shining in *P. virgatum*).
8a. Plants robust, 1 to 2 m tall.
Spikelets pubescent at least toward the summit; fruit brown at maturity---------- 39. P. VIRGATUM.
Spikelets glabrous; fruit pale.
Culms ascending; leaves crowded toward the base. 36. P. DIFFORME.
Culms erect or suberect, leafy throughout.
Glume and sterile lemma slightly inflated and wrinkled, green---------- 37. P. FLORIDANUM.
Glume and sterile lemma not inflated and wrinkled, rusty-tinged---------- 38. P. GIGANTEUM.
8b. Plants not robust, if more than 1 m tall, culms relatively slender.
9a. Spikelets suborbicular or broadly obovate or broadly oval.
Spikelets turgidly plano-convex, 3.5 to 4 mm long. 36. P. DIFFORME.
Spikelets depressed plano-convex or lenticular, 2.2 to 3.4 mm long.
Spikelets solitary; glume and sterile lemma firm.
Spikelets orbicular, 3 to 3.2 mm long, scarcely one-third as thick; blades usually equaling the base of the panicle or overtopping it------- 33. P. CIRCULARE.
Spikelets longer than broad, more than one-third as thick; panicle usually much exceeding the blades.
Sheaths and blades pilose, mostly conspicuously so. 32. P. LONGIPILUM.
Sheaths and blades from glabrous to sparsely pilose. 31. P. LAEVE.
Spikelets paired and solitary in the same raceme (rarely all solitary or all paired).
Spikelets 2.2 to 2.5 mm (rarely to 2.8 mm) long; foliage not conspicuously villous-------- 34. P. PRAECOX.
Spikelets 2.7 to 3.4 mm long; lower sheaths and blades mostly conspicuously villous at least at base. 35. P. LENTIFERUM.
9b. Spikelets elliptic to oval or obovate.
Culms decumbent at base, rooting at the lower nodes (occasional plants in dry situations erect), branching.
Spikelets turgidly plano-convex, 3 to 3.2 mm long; culms rather stout---------- 6. P. PUBIFLORUM.

Spikelets depressed plano-convex; culms rather slender.
Spikelets glabrous---------- 7. P. LIVIDUM.
Spikelets pubescent---------- 8. P. HARTWEGIANUM.
Culms erect to spreading, not rooting at the nodes.
Spikelets about 1.3 mm long, obovate, glandular-pubescent. 25. P. BLODGETTII.
Spikelets 1.5 mm or more long, elliptic or elliptic-obovate, the obscure pubescence not glandular.
Nodes or some of them appressed-pilose; spikelets green or purplish---------- 26. P. CAESPITOSUM.
Nodes glabrous; spikelets pale or brownish. 27. P. LAXUM.

1. Dissécta.—Blades flat; rachis foliaceous. Aquatics, subaquatics, or plants of wet ground.

1. Paspalum disséctum L. (Fig. 1201.) Glabrous, olive-green, creeping, freely branching, the flowering branches ascending, 20 to 60 cm long; blades thin, 3 to 6 cm long, 4 to 5 mm wide; panicles terminal and axillary, the racemes 2 to 4, usually erect, 2 to 3 cm long; rachis 2 to 3 mm wide; spikelets solitary, obovate, subacute, 2 mm long. 2↓ —On muddy and sandy banks of ponds and ditches or in shallow water, New Jersey and Missouri to Florida and Texas; Cuba (fig. 1202).

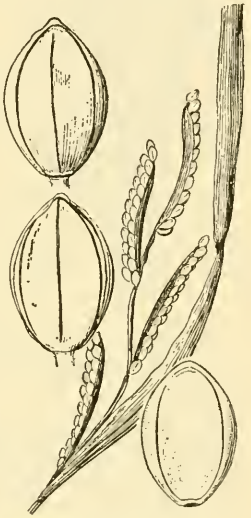

FIGURE 1201.—*Paspalum dissectum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Commons 85 Del.)

2. Paspalum acuminátum Raddi. (Fig. 1203.) Culms decumbent at base, sometimes extensively creeping, 30 to 100 cm long; blades 4 to 12 cm long, 5 to 12 mm wide; racemes 3 to 5, erect or ascending, 3.5 to 7 cm long; rachis 3 to 3.5 mm wide; spikelets solitary, 3.5 mm long, abruptly pointed. 2↓ —In shallow water or wet open ground from southern Louisiana and Texas to Argentina.

3. Paspalum répens Bergius. (Fig. 1204.) Culms mostly submerged, sometimes as much as 2 m long, the sheaths on the floating branches inflated; blades usually 10 to 20 cm long, 12 to 15 mm wide; panicle 10 to 15 cm long, of numerous ascending, spreading, or recurved racemes, 3 to 5 cm long, falling entire, the rachis about 1.5 mm wide; spikelets solitary, elliptic, 1.4 to 2 mm long, usually pubescent, the sterile lemma pinkish at base. 2↓ (*P. mucronatum* Muhl.)—Floating in sluggish streams or standing water or creeping in wet places, South Carolina to Indiana, Kansas, and Texas, south to Argentina (fig. 1205).

FIGURE 1202.—Distribution of *Paspalum dissectum.*

PASPALUM RACEMÓSUM Lam. Branching annual; blades 5 to 12 cm long, 1 to 2 cm wide; panicles tawny to purple; racemes numerous, 1 to 2 cm long; spikelets about 2.7 mm long, pointed; sterile lemma transversely fluted either side of the midnerve. ⊙ —Sometimes cultivated for ornament. Peru.

2. Dísticha.—Creeping with wiry compressed culms and stolons or rhizomes; racemes mostly 2, paired or approximate.

4. Paspalum vaginátum Swartz. (Fig. 1206.) Flowering culms 8 to 60 cm tall; sheaths usually overlapping; blades 2.5 to 15 cm long, 3 to 8 mm wide, tapering to an involute apex; racemes at first erect, usually spreading or reflexed at maturity, 2 to 5 cm long; rachis 1 to 2 mm wide; spikelets solitary, 3.5 to 4 mm long, ovate-lanceolate, acute, pale-straminеous; first glume rarely developed; midnerve of the second glume

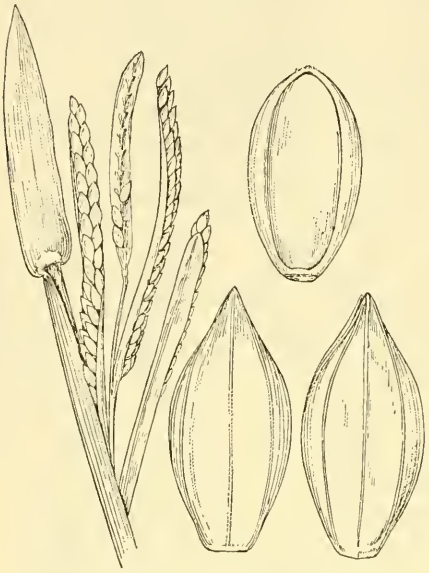

FIGURE 1203.—*Paspalum acuminatum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Arsène 3132, Mex.)

FIGURE 1204.—*Paspalum repens.* Panicle, × 1 two views of spikelet, and floret, × 10 (Hitchcock 9179, Canal Zone.)

and sterile lemma usually suppressed. 2n —Seacoasts and brackish sands, often forming extensive colonies, North Carolina to Florida and Texas, south to Argentina (fig. 1207); tropics of Eastern Hemisphere.

FIGURE 1205.—Distribution of *Paspalum repens.*

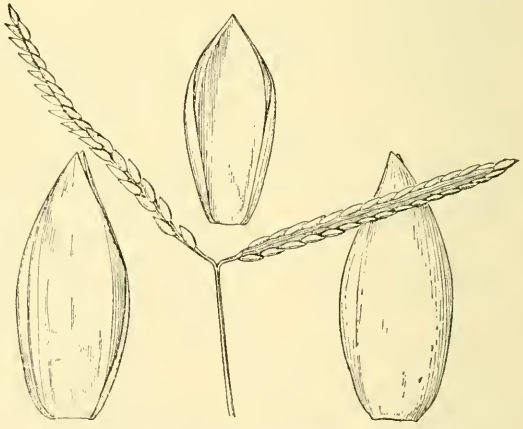

FIGURE 1206.—*Paspalum vaginatum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Hitchcock 9866, Jamaica.)

5. Paspalum dístichum L. KNOTGRASS. (Fig. 1208.) Resembling *P. vaginatum*, sometimes with extensively creeping stolons with pubes-

cent nodes; racemes 2 to 7 cm long, commonly incurved; spikelets 2.5 to 3.5 mm long, elliptic, abruptly acute, pale green; first glume frequently developed; second glume appressed-pubescent, the midnerve in glume and sterile lemma developed. ♃ —Ditches and wet, rarely brackish places, New Jersey to Florida, Tennessee, and Arkansas, west to California and north along the coast to Washington; Idaho; south to Argentina (fig. 1209); warm coasts of the Eastern Hemisphere.

FIGURE 1207.—Distribution of *Paspalum vaginatum.*

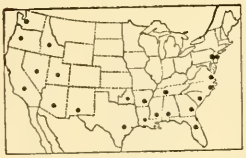

FIGURE 1209.—Distribution of *Paspalum distichum.*

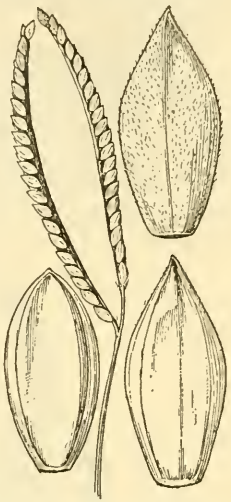

FIGURE 1208.—*Paspalum distichum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Hitchcock 9394, Jamaica.)

PASPALUM PAUCISPICÁTUM Vasey. Resembling vigorous specimens of *P. distichum,* but with 3 to 5 racemes with mostly paired spikelets. ♃ — A specimen collected by Palmer in 1888, said to be from "Southern California", is in the United States National Herbarium. The locality is doubtful, the species ranging from Sonora to Oaxaca.

3. Lívida.—Culms compressed; racemes few to several, mostly plants of alkaline soil.

FIGURE 1210.—*Paspalum pubiflorum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Hitchcock 5555, Mex.)

6. Paspalum pubiflórum Rupr. (Fig. 1210.) Culms decumbent at the base, 40 to 100 cm tall;

FIGURE 1211.—Distribution of *Paspalum pubiflorum.*

sheaths, at least the lower, sparsely papillose-pilose; blades flat, usually 10 to 15 cm long, 6 to 14 mm wide, usually with a few stiff hairs at the rounded base; racemes mostly 3 to 5, 2 to 10 cm long, rather thick, erect to spreading, the rachis 1.2 to 2 mm wide; spikelets obovate, pubescent, about 3 mm long. ♃ (*P. hallii* Vasey and Scribn.)—Moist open ground,

banks, low woods, along streams and irrigation ditches, especially in alkaline clay soil, Louisiana and Texas; Mexico and western Cuba (fig. 1211).

PASPALUM PUBIFLORUM var. GLÁBRUM Vasey. Somewhat more robust, the sheaths less pilose, the racemes commonly longer and often more than 5; spikelets glabrous. 2↓ (*P. geminum* Nash; *P. laeviglume* Scribn.)—Moist low open ground, woods, and ditch banks, North Carolina and Indiana to Florida, west to Kansas and Texas.

7. Paspalum lívidum Trin. LONGTOM. (Fig. 1212.) Glabrous; culms solitary or few in a tuft, from a decumbent or creeping base, 50 to 100 cm tall: blades 15 to 25 cm long, 3 to 6 mm wide; racemes

FIGURE 1212.—*Paspalum lividum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Arsène 3176, Mex.)

FIGURE 1213.—*Paspalum hartwegianum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Buckley, Tex.)

usually 4 to 7, ascending, flexuous; rachis 1.5 to 2 mm wide, dark livid purple; spikelets 2 to 2.5 mm long, obovate, subacute. 2↓ — Low ground, wet savannas, and swamps, and along streams and ditches, Alabama to Texas and Mexico, south to Argentina; Cuba.

8. Paspalum hartwegiánum Fourn. (Fig. 1213.) Culms ascending from a decumbent base, 50 to 150 cm tall; blades 10 to 35 cm long, 2 to 6 mm wide, the margins very scabrous; racemes usually 4 to 7, ascending, 2 to 9 cm long; rachis 1 to 1.5 mm wide; spikelets imbricate, about 3 mm long, elliptic, apiculate, softly pubescent. 2↓ (*P. buckleyanum* Vasey.)—Wet prairies, alkaline meadows, and along irrigation ditches, sometimes growing in the water, southern Texas and throughout Mexico.

4. Notáta.—Culms in dense tufts, compressed, leafy at base; sheaths keeled; racemes 2, rarely 3, paired or nearly so; spikelets solitary, glabrous.

9. Paspalum notátum Flügge. BAHIA GRASS. (Fig. 1214.) Culms 15 to 50 cm tall from a short, stout, woody, horizontal rhizome; blades flat or folded; racemes recurved-ascending, usually 4 to 7 cm long; spikelets ovate to obovate, 3 to 3.5 mm long, smooth and shining.

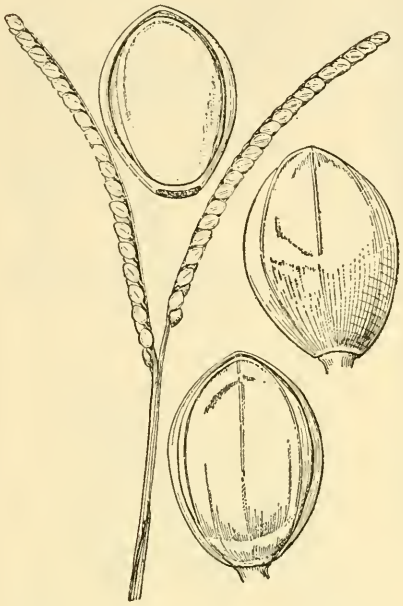

FIGURE 1214.—*Paspalum notatum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Chase 6639, P.R.)

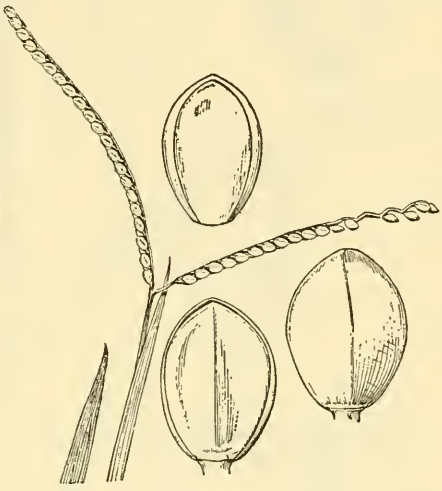

FIGURE 1215.—*Paspalum minus.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type coll.)

♃ —Introduced sparingly in New Jersey, Florida, and Louisiana; Mexico and the West Indies to South America.

10. Paspalum mínus Fourn. (Fig. 1215.) Resembling *P. notatum*, commonly in denser mats; culms rarely more than 30 cm tall; racemes more slender; spikelets 2 to 2.5 mm long, less shining than those of *P. notatum*. ♃ —Open slopes and savannas, coast of Texas (Galveston Bay); Mexico to West Indies and Paraguay.

11. Paspalum álmum Chase. COMBS PASPALUM. (Fig. 1216.) Culms in very dense tufts; blades flat, 2 to 3 mm wide, long-hirsute on the upper surface at base, papillose-hirsute on the lower surface toward the ends, the margins stiffly ciliate toward base; racemes slender, approximate, scarcely paired, occasionally 3, ascending, 5 to 9 cm long; rachis 1 mm wide, minutely wing-margined; spikelets 3 mm long, 1.8 to 2 mm wide, obovate-elliptic; sterile lemma slightly concave. ♃ —Sandy or silty clay loam, Jefferson County, Tex.; Brazil and Paraguay, Argentina. An excellent forage grass.

5. Setácea.—Culms compressed from a knotted base or very short rhizome; blades mostly flat; inflorescence terminal and axillary, the axillary sometimes hidden in the sheaths; racemes 1 to few, slender, subcylindric; spikelets in pairs, crowded. Species closely related with frequent intergrades.

12. Paspalum longepedunculátum LeConte. (Fig. 1217.) Culms slender, ascending or suberect, 25 to 80 cm tall; leaves mostly aggregate at the base, the sheaths ciliate on the margin; blades usually

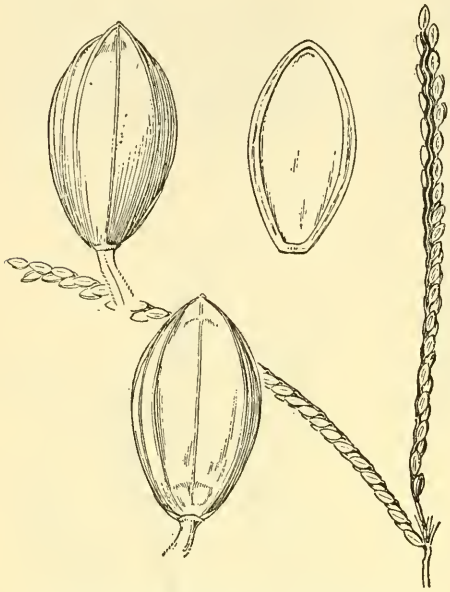

FIGURE 1216.—*Paspalum almum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type.)

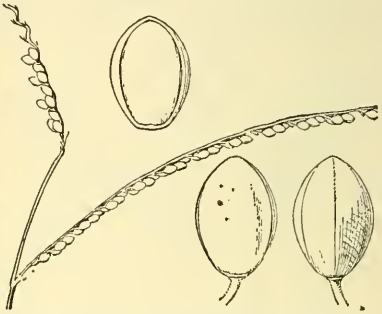

FIGURE 1217.—*Paspalum longepedunculatum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Nash 2074, Fla.)

FIGURE 1218.—Distribution of *Paspalum longepedunculatum.*

folded at base, 4 to 10 cm long, rarely longer, 3 to 8 mm wide, stiffly papillose-ciliate on the margin, the hairs 1.5 to 3 mm long; racemes on very slender finally elongate peduncles, 1 or 2, rarely 3, on the primary, 1 on the axillary peduncles; racemes arching, 3 to 8 cm long; spikelets about 1.5 mm long, elliptic-obovate, glabrous. ♃ —Sandy soil, mostly in low pine land or flat woods, Georgia and Kentucky to Florida and Mississippi (fig. 1218).

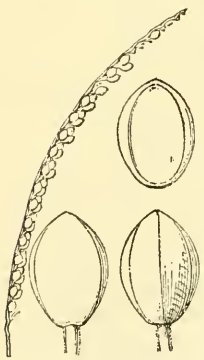

FIGURE 1219.—*Paspalum setaceum.* Raceme × 1; two views of spikelet, and floret, × 10. (Hitchcock 306, S.C.)

13. Paspalum setáceum Michx. (Fig. 1219.) Culms slender, erect, usually 30 to 50 cm tall; sheaths pilose; blades rather firm, erect or nearly so, linear, about 10 to 12 cm long, 2 to 6 mm wide, densely pilose on both surfaces and papillose-ciliate on the margin; racemes on slender peduncles, solitary or sometimes 2, arching, 5 to 7 cm long; spikelets elliptic-obovate, about 1.5 mm long, glabrous or minutely pubescent. ♃ —Sandy soil, mostly open woods, of or near the Atlantic Coastal Plain, Long Island to Florida and Texas; Mexico (fig. 1220).

FIGURE 1220.—Distribution of *Paspalum setaceum.*

14. Paspalum débile Michx. (Fig. 1221.) Differing from *P. setaceum* in the stouter, more spreading culms, the foliage more crowded at base, densely grayish villous, the blades on the average wider; racemes more commonly 2; spikelets 1.8 to 1.9 mm long, pubescent. ♃ —Sandy, mostly dry soil, barrens and flatwoods, Long Island to Florida and Texas; Mexico and Cuba (fig. 1222).

15. Paspalum supínum Bosc. (Fig. 1223.) Culms relatively stout, widely spreading, 30 to 90 cm tall; sheaths usually hirsute; blades 15 to 25 cm long, 8 to 15 mm wide, hirsute; racemes usually 2 to 4, rarely to 6, 4 to 10 cm long; spikelets elliptic-obovate, 2 mm

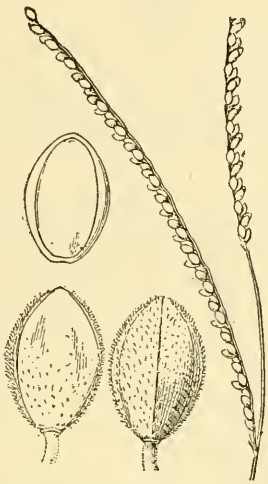

FIGURE 1221.—*Paspalum debile.* Panicle, × 1; two views of spikelet, and floret, × 10. (Nash 946, Fla.)

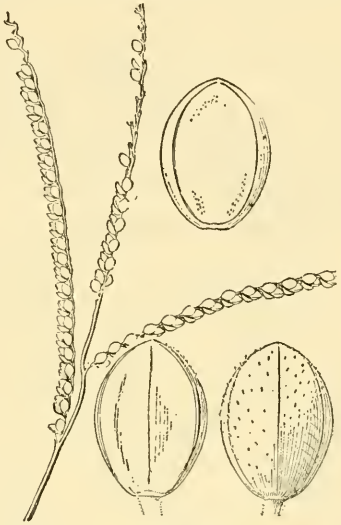

FIGURE 1223.—*Paspalum supinum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Chase 4572 N.C.)

FIGURE 1222.—Distribution of *Paspalum debile.*

FIGURE 1224.—Distribution of *Paspalum supinum.*

long, glabrous, or the glume minutely pubescent. ♃ —Dry, sandy, open ground and old fields, North Carolina to Florida and west to Louisiana (fig. 1224).

16. Paspalum psammóphilum Nash. (Fig. 1225.) Forming dense grayish-olivaceous mats, the culms usually prostrate, 25 to 100 cm long; sheaths appressed-pubescent; blades 4 to 16 cm long, 4 to 11 mm wide, densely appressed-pubescent; racemes 1 to 3, commonly 2, 4 to 9 cm long, the axillary ones wholly or partly included in the sheaths; spikelets suborbicular, 2 mm long, the glume densely pubescent. ♃ —Dry sandy soil, mostly near the coast, Massachusetts to New Jersey (fig. 1226).

17. Paspalum stramíneum Nash. (Fig. 1227.) Yellowish green, the culms erect, 40 to 100 cm tall; blades 6 to 25 cm long, rarely longer,

6 to 15 mm wide, puberulent on both surfaces and sparsely pilose as well, or the lower surface nearly glabrous; racemes 2 or 3, 6 to 14 cm long, the axillary ones often wholly or partly included in the sheaths, short racemes commonly borne in basal sheaths; spikelets subor-

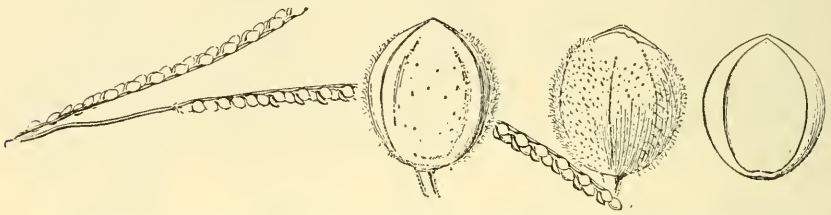

FIGURE 1225.—*Paspalum psammophilum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Graves, N. Y.)

bicular, 2.1 to 2.2 mm long, pale, from densely pubescent to glabrous. ♃ (*P. bushii* Nash.)—Sandy soil, in open ground or open woods, Indiana to Minnesota, Texas, Arizona, and northwestern Mexico (fig. 1228).

18. Paspalum pubéscens Muhl. (Fig. 1229.) Culms ascending, 45 to 90 cm tall, often pilose at the summit; sheaths usually pilose toward the summit; blades 8 to 20 cm long, 2 to 10 mm wide (rarely larger), pilose on both surfaces; racemes 1 to 3, 4 to 17 cm long; spikelets about 2 mm long, suborbicular, usually glabrous. ♃ (*P. muhlenbergii* Nash.)—Open ground or open woods, common in old fields and pastures, especially in sandy regions, Vermont to Florida, west to Michigan and Texas (fig. 1230).

FIGURE 1226.—Distribution of *Paspalum psammophilum.*

FIGURE 1228.—Distribution of *Paspalum stramineum.*

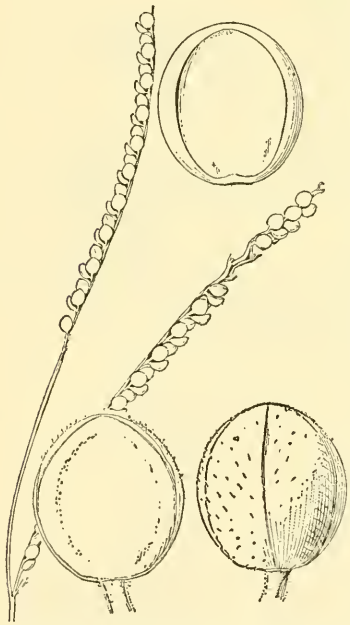

FIGURE 1227.—*Paspalum stramineum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type.)

19. Paspalum ciliatifólium Michx. (Fig. 1231.) Culms erect to spreading, 35 to 90 cm tall; sheaths glabrous or the lower puberulent; blades 10 to 35 cm long, 7 to 20 mm wide (rarely larger), usually strongly ciliate along the margin and glabrous otherwise; racemes 1 to 3, usually 7 to 10 cm long; spikelets about 2 mm long, suborbicular, the glumes often minutely pubescent. ♃ (*P. chapmani* Nash; *P. eggertii* Nash; *P. blepharophyllum* Nash; *P. epile* Nash.)—Open ground or open woods, mostly sandy, New Jersey to Florida,

Tennessee, Arkansas, and Texas; Honduras and the West Indies (fig. 1232). This species is exceedingly variable. Pubescence on foliage and spikelets varies in a single plant. Rather stout, somewhat paler, seacoast plants, with firmer blades scarcely ciliate, are the form

FIGURE 1230.—Distribution of *Paspalum pubescens.*

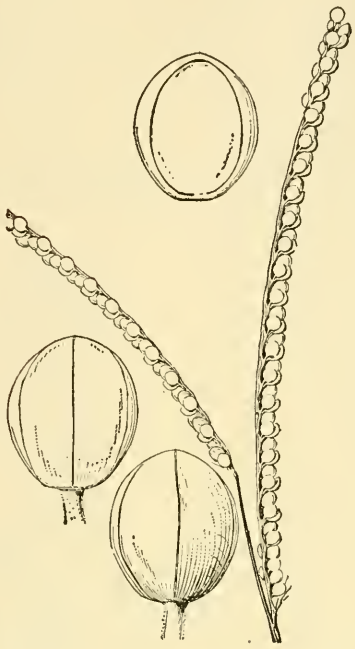

FIGURE 1229.—*Paspalum pubescens.* Panicle, × 1; two views of spikelet, and floret, × 10. (Hitchcock 298, Ga.)

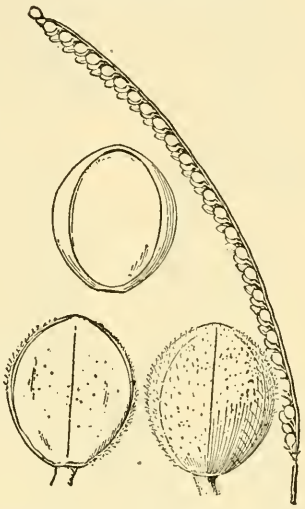

FIGURE 1231.—*Paspalum ciliatifolium.* Raceme, × 1; two views of spikelet, and floret, × 10. (Nash 1426, Fla.)

described as *P. epile.* Plants with softly pubescent lower sheaths, and blades but slightly ciliate, are the form described as *P. eggertii.* The shape of the spikelet varies in a single raceme from elliptic-obovate to suborbicular. The spikelets tend to become rounder at maturity, but both mature and immature are found of both shapes.

20. Paspalum propínquum Nash. (Fig. 1233.) Resembling *P. ciliatifolium,* the blades firmer and narrower, the spikelets slightly smaller, subacute. 2↓ — Sandy savannas and sand barrens overlying limestone, peninsular Florida; West Indies; Vera Cruz to Panama.

FIGURE 1232.—Distribution of *Paspalum ciliatifolium.*

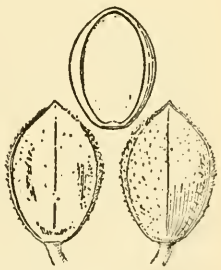

FIGURE 1233.—*Paspalum propinquum.* Two views of spikelet, and floret, × 10. (Type.)

21. Paspalum rigidifólium Nash. (Fig. 1234.) Culms erect, rather stiff, purplish, 25 to 75 cm tall; sheaths glabrous or the lower grayish-pubescent; blades firm, linear, mostly 10 to 15 cm long, 2 to 5 mm wide, usually not wider than the summit of the sheath, glabrous or minutely puberulent; racemes 1 or 2,

7 to 14 cm long; spikelets usually 2.2 to 2.4 mm long, obovate-elliptic, glabrous or nearly so. 2↓ —Sand barrens and high pineland, peninsular Florida to Texas (fig. 1235).

6. Dimorphóstachys.—Inflorescence terminal and axillary; racemes one to few, slender; spikelets in pairs, the first glume usually developed on one of the pair, often on both, or sometimes obsolete on both.

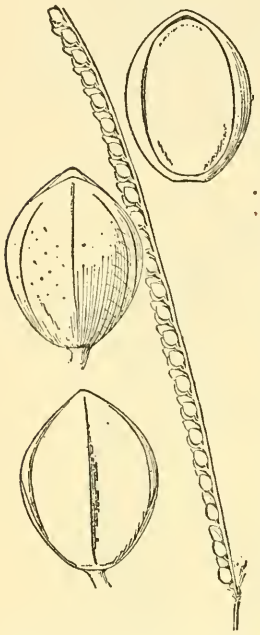

FIGURE 1234.—*Paspalum rigidifolium.* Raceme, × 1; two views of spikelet, and floret, × 10. (Type.)

22. Paspalum unispicátum (Scribn. and Merr.) Nash. (Fig. 1236.) Culms one to few in a tuft from horizontal scaly rhizomes, erect or ascending, 50 to 80 cm tall, simple or with a single erect leafy branch; blades flat, rather stiff, 10 to 30 cm long, 8 to 15 mm wide, stiffly papillose-ciliate on the margin, sparsely papillose-hirsute on both surfaces, or scaberulous only; racemes usually solitary, one terminal and one from the axil of the uppermost sheath, 6 to 20 cm long; spikelets about 3.2 mm long, elliptic; first glume on the primary spikelet minute, sometimes obsolete, on secondary spikelet mostly half to three-fourths as long as the spikelet. 2↓ —Meadows, savannas, open slopes, and banks, southern Texas to Venezuela and Argentina; Cuba.

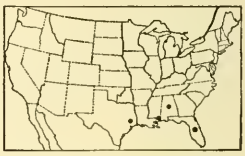

FIGURE 1235.—Distribution of *Paspalum rigidifolium.*

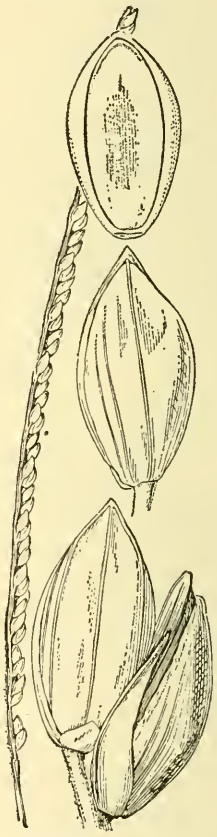

FIGURE 1236.—*Paspalum unispicatum.* Raceme, × 1; two views of spikelet, and floret, × 10. (Type.)

23. Paspalum monostáchyum Vasey. (Fig. 1237.) Culms one to few from horizontal scaly rhizomes, erect, 50 to 120 cm tall; blades elongate, slender, terete, firm; racemes 1 or 2, 10 to 30 cm long; spikelets 3 to 3.5 mm long, subovate-elliptic, the pedicels of the pair nearly equal; first glume often developed in few to several of the primary spikelets, commonly wanting or rudimentary. 2↓ (*P. solitarium* Nash.)—Moist places in flatwoods or coastal dunes, southern Florida and Texas.

24. Paspalum lángei (Fourn.) Nash. (Fig. 1238.) Culms ascending, 30 to 100 cm tall; blades flat, rather thin, 10 to 40 cm long, 6 to 15 mm wide, glabrous to sparsely pubescent, the lower tapering to a narrow base; peduncles 1 to 3 from the upper sheath, often also from the middle sheaths; racemes 2 to 5, 4 to 10 cm long; spikelets 2.2 to 2.6 mm long, elliptic-obovate, pubescent and glandular-speckled;

first glume minute or obsolete on the primary spikelet, one-fourth to one-third as long as the spikelet on the secondary. 2↓ (*Dimorphostachys ciliifera* Nash; *Paspalum ciliiferum* Hitchc.)—Moist woods and shaded slopes and banks, occasionally in open ground, mostly at low altitudes, Florida, Louisiana, Texas; Greater Antilles to Venezuela.

7. Caespitósa.—Culms simple or with a single branch, its leaf sometimes hidden in the parent sheath, the inflorescence appearing to be axillary; racemes few to several.

25. Paspalum blodgéttii Chapm. (Fig. 1239.) Cespitose, with tough, commonly somewhat swollen and bulblike base, the scales densely pubescent; culms erect, slender, 40 to 100 cm tall; lower leaves crowded; blades flat, 5 to 25 cm long, mostly 5 to 10 mm wide; racemes usually 3 to 8, slender, remote, 2 to 8 cm long; spikelets about 1.3 mm long, obovate, the glume glandular-pubescent. 2↓ (*P. simpsoni* Nash; *P. gracillimum* Nash.)—Open or brushy calcareous soil, southern Florida; Yucatan, Honduras, Bahamas, and the Greater Antilles.

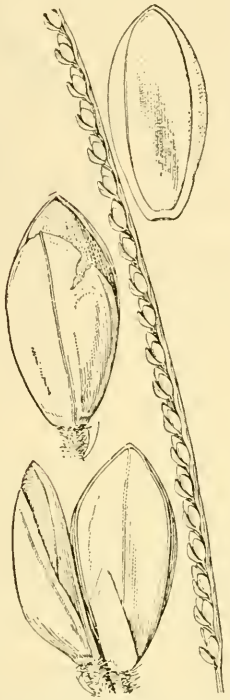

FIGURE 1237.—*Paspalum monostachyum.* Raceme, × 1; two views of spikelet, and floret, × 10. (Type.)

FIGURE 1238.—*Paspalum langei.* Panicle, × 1; two views of spikelet, and floret, × 10. (Pringle 3991, Mex.)

26. Paspalum caespitósum Flügge. (Fig. 1240.) Cespitose, bluish green; culms erect, rather wiry, 30 to 60 cm tall; blades flat, folded or involute, 5 to 20 cm long, rarely longer, 4 to 10 mm wide; racemes usually 3 to 5, relatively thick, remote, ascending, 1.5 to 6 cm long; spikelets 1.5 to 1.8 mm long, elliptic, sparsely appressed-pubescent to nearly glabrous. 2↓ —Mostly in partly shaded humus in limestone soil or rock, sometimes in sandy pinelands; southern Florida, Mexico, Central America, and the West Indies.

27. Paspalum láxum Lam. (Fig. 1241.) Culms mostly 50 to 75 cm tall, compressed, rigid, ascending; blades more or less involute, mostly 20 to 30 cm long, 3 to 8 mm wide, usually glabrous; racemes usually 3 to 5, mostly remote, 3 to 10 cm long; spikelets about 2 mm long, elliptic-obovate, the glume pubescent. ♃ (*P. glabrum* Poir.)—Sandy and limestone soils, characteristic of coconut groves, Key West, Fla.; West Indies.

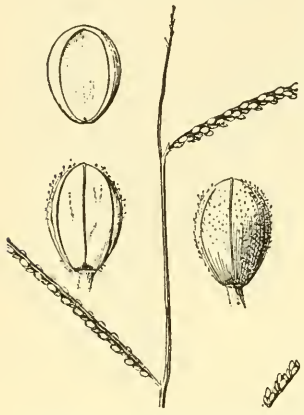

FIGURE 1239.—*Paspalum blodgettii.* Panicle, × 1; two views of spikelet, and floret, × 10. (Simpson, Fla.)

8. Conjugáta.—Stoloniferous; blades flat; racemes 2, paired, rarely a third below, slender; spikelets flattened concavo-convex, solitary, silky-fringed.

28. Paspalum conjugátum Bergius. (Fig. 1242.) Extensively creeping, with long leafy stolons and ascending suberect flowering branches, 20 to 50 cm tall; nodes of stolons usually conspicuously pilose; blades rather thin, 8 to 12 cm long, 5 to 15 mm wide, usually glabrous; racemes widely divaricate, 8 to 12 cm long; spikelets 1.4 to 1.8 mm long, ovate, light yellow, the margin conspicuously ciliate fringed. ♃ —A common weed in cultivated and waste ground, southern Florida to Texas, south to Argentina; West Indies (fig. 1243); tropics of Old World.

FIGURE 1240.—*Paspalum caespitosum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Poiteau, Dominican Republic.)

9. Dilatáta.—Rather stout, in leafy clumps; blades flat; racemes few to numerous, spikelets in pairs, flat, silky-fringed.

29. Paspalum dilatátum Poir. DALLIS GRASS. (Fig. 1244.) Culms tufted, leafy at base, mostly 50 to 150 cm tall, ascending or erect from a decumbent base; blades 10 to 25 cm long, 3 to 12 mm wide; racemes usually 3 to 5, spreading, 6 to 8 cm long; spikelets ovate, pointed, 3 to 3.5 mm long, fringed with long white silky hairs and sparsely silky on the surface. ♃ —In low ground, from rather dry prairie to marshy meadows, New Jersey to Tennessee and Florida, west to Arkansas and Texas; adventive in Oregon, Colorado, Arizona, and California; native of South

FIGURE 1241.—*Paspalum laxum.* Panicle, × 1; two views of spiklet, and floret, × 10. (Richard's specimen in Paris Herbarium.)

FIGURE 1242.—*Paspalum conjugatum.* Plant, × ½; two views of spikelet, and floret, × 10. (Baker 90, Cuba.)

FIGURE 2143.—Distribution of *Paspalum conjugatum.*

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FIGURE 1244.—*Paspalum dilatatum.* Plant, × ½; two views of spikelet, and floret, × 10. (Hitchcock 297, La.)

FIGURE 1245.—Distribution of *Paspalum dilatatum*.

FIGURE 1246.—*Paspalum urvillei*. Plant, × ½; two views of spikelet, and floret, × 10. (Chase 4388, La.)

America (fig. 1245). Widely known as paspalum-grass, water-paspalum, water-grass, or more commonly, simply paspalum. Introduced into the southern United States from Uruguay or Argentina about

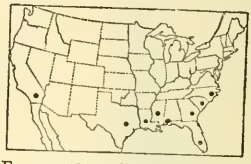

FIGURE 1247.—Distribution of *Paspalum urvillei.*

FIGURE 1248.—*Paspalum laeve.* Plant, × ½; two views of spikelet, and floret, × 10. (Chase 2600, D.C.)

the middle of the last century, now common throughout the Gulf States. Valuable pasture grass. Dallis grass was named for A. T. Dallis of La Grange, Ga., who grew it extensively.

30. Paspalum urvíllei Steud. VASEY GRASS. (Fig. 1246.) Culms in large clumps, erect, mostly 1 to 2 m tall; lower sheaths coarsely hirsute; blades mostly elongate, 3 to 15 mm wide, pilose at base; panicle erect, 10 to 40 cm long, of about 12 to 20 rather crowded, ascending racemes, 7 to 14 cm long ; spikelets 2.2 to 2.7 mm long, ovate, pointed, fringed with long white silky hairs, the glume appressed-silky. 2l (*P. larranagai* Arech.; *P. vaseyanum*, Scribn.)—Along ditches and roadsides, and in waste ground, mostly in rather moist soil; North Carolina to Florida and west to Texas; southern California, south to Argentina (fig. 1247).

FIGURE 1249.—Distribution of *Paspalum laeve.*

10. Laévia.—Rather tall, simple or occasionally with reduced flowering branches; blades mostly flat; racemes few to several; spikelets broadly oval to orbicular, depressed planoconvex, glabrous.

31. Paspalum laéve Michx. (Fig. 1248.) Culms erect or ascending leafy at base, 40 to 100 cm tall; sheaths keeled, glaborus or nearly so; blades usually folded at base, flat or folded above, 5 to 30 cm long, 3 to 10 mm wide, glabrous to ciliate or sparsely pilose on the upper surface or sometimes toward the base beneath; racemes usually 3 or 4, spreading, 3 to 10 cm long; spikelets broadly oval, 2.5 to 3 mm long.

FIGURE 1251.—Distribution of *Paspalum longipilum.*

2l (*P. angustifolium* LeConte; *P. australe* Nash.)—Meadows, open woods, old fields, and waste ground, New Jersey and Pennsylvania to Florida, Arkansas, and eastern Texas (fig. 1249).

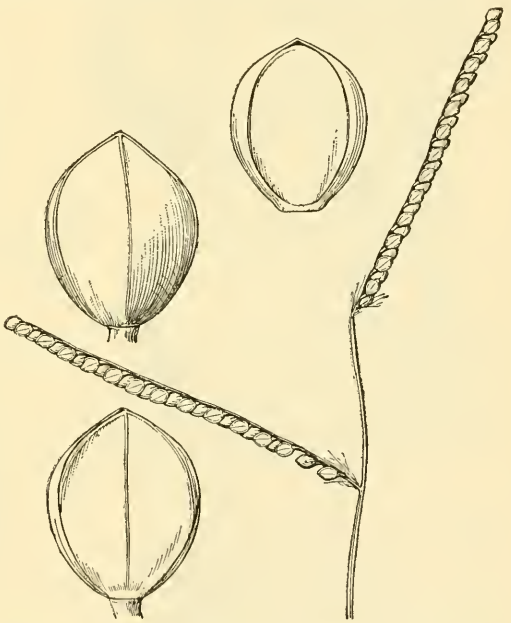

FIGURE 1250.—*Paspalum longipilum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type coll.)

32. Paspalum longípilum Nash. (Fig. 1250.) Similar to *P. laeve*, usually less leafy at base, sheaths and blades pilose; racemes somewhat more lax than in *P. laeve*. 2l (*P. plenipilum* Nash.)—Damp mostly sandy soil, savannas, open woods, and wet pine barrens, New York to Tennessee, Florida, and Texas (fig. 1251).

33. Paspalum circulâre Nash. (Fig. 1252.) Culms in dense leafy clumps, 30 to 80 cm tall; sheaths pilose to nearly glabrous; blades mostly erect, commonly about equaling the inflorescence, 15 to 30 cm long, 5 to 10 mm wide, usually pilose on the upper surface; racemes 2 to 7, mostly suberect, 5 to 12 cm long; spikelets nearly orbicular,

about 3 mm long. ♃ (*P. praelongum* Nash.)—Fields, meadows, and open waste ground, Connecticut to North Carolina and Mississippi, west to Kansas and Texas (fig. 1253).

34. Paspalum praecox Walt. (Fig. 1254.) Culms erect from short scaly rhizomes, 50 to 100 cm tall; sheaths keeled, glabrous, or the lower villous; blades 15 to 25 cm long, 3 to 7 mm wide, glabrous or nearly so; racemes usually 4 to 6, ascending to arcuate-spreading,

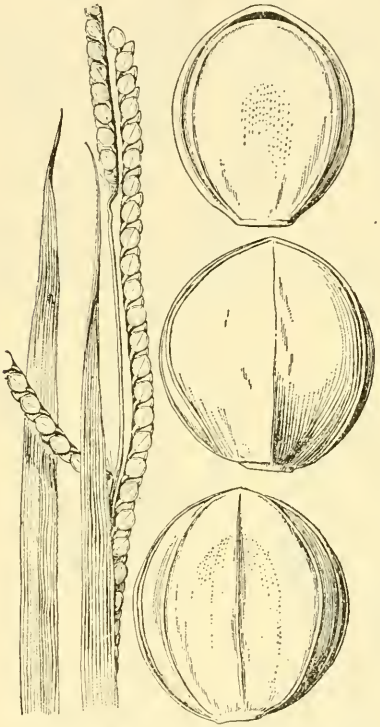

FIGURE 1252.—*Paspalum circulare.* Panicle, × 1; two views of spikelet, and floret, × 10. (Chase 3836, Md.)

FIGURE 1253.—Distribution of *Paspalum circulare.*

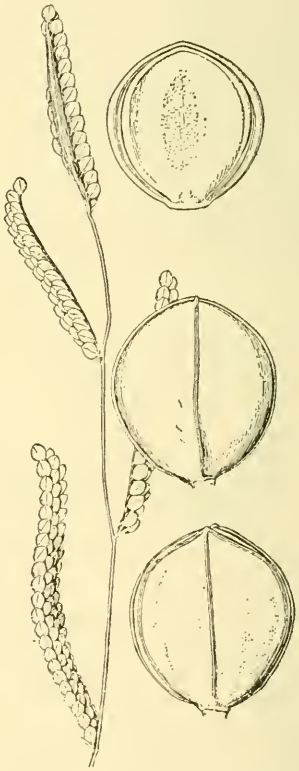

FIGURE 1254.—*Paspalum praecox.* Panicle, × 1; two views of spikelet, and floret, × 10. (Stone 377, S.C.)

FIGURE 1255.—Distribution of *Paspalum praecox.*

2 to 7 cm long, the common axis very slender; rachis about 1.5 mm wide, purplish; spikelets usually solitary and paired in each raceme, strongly flattened, suborbicular, 2.2 to 2.8 mm long, the glume and sterile lemma thin and fragile. ♃ —Wet pine barrens, borders of cypress swamps, moist places in flatwoods, and wet savannas, in the Coastal Plain, North Carolina to central Florida and along the Gulf to Texas (fig. 1255).

35. Paspalum lentíferum Lam. (Fig. 1256.) Similar to *P. praecox;* culms more robust, sometimes as much as 150 cm tall; sheaths less strongly keeled; blades usually more or less pilose; racemes usually 4 or 5; spikelets 2.7 to 3.4 mm long, broadly oval. 2↓ (*P. glaberrimum* Nash; *P. tardum* Nash; *P. kearneyi* Nash; *P. amplum* Nash.)—Moist pine barrens, borders of flatwoods, and cypress swamps, and in savannas on the Coastal Plain, from North Carolina to southern Florida and along the Gulf to Texas (fig. 1257).

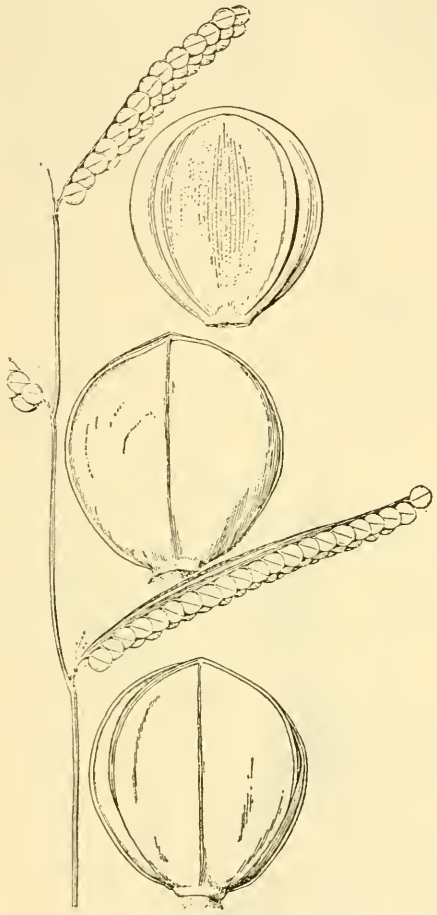

FIGURE 1256.—*Paspalum lentíferum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Harper 1629, Ga.)

11. Floridána.—Mostly robust, culms simple; blades mostly flat; racemes few; spikelets large, rather turgid, glabrous.

36. Paspalum diffórme LeConte. (Fig. 1258.) Culms solitary or few from a short knotty rhizome, rather stout, 35 to 75 cm tall; leaves commonly crowded at the base; blades 10 to 15 cm long, 5 to 10 mm wide, usually pilose on the upper surface toward base; racemes 2 to 4, ascending to suberect, 3.5 to 8 cm long;

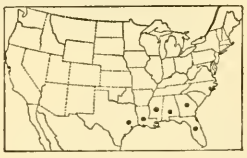

FIGURE 1257.—Distribution of *Paspalum lentiferum.*

spikelets 3.5 to 4 mm long, oval to obovate. 2↓ —Moist sandy soil in open ground and in flatwoods, in the Coastal Plain, Georgia, to Orange County, Fla., west near the Gulf to Louisiana (fig. 1259).

37. Paspalum floridánum Michx. (Fig. 1260.) Culms solitary or few from short stout scaly rhizomes, 1 to 2 m tall; sheaths villous to nearly glabrous; blades firm, flat or folded, 15 to 50 cm long, 4 to 10 mm wide, usually villous at least on the upper surface toward base; racemes usually 2 to 5, 4 to 12 cm long; spikelets crowded, oval, about 4 mm long. 2↓ —Low moist sandy soil, pine woods, flatwoods, savannas, and low prairies, in the Coastal Plain from Maryland to central Florida and along the Gulf to Texas, north in the valleys to Missouri and Oklahoma (fig. 1261). PASPALUM FLORIDANUM var. GLABRÁTUM Engelm. More robust, taller; foliage glabrous or nearly so; racemes longer, more spreading. 2↓ —Brackish marshes and low, sandy,

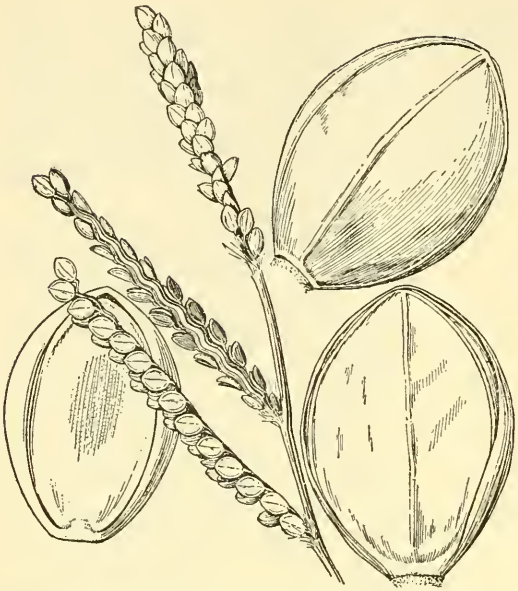

FIGURE 1258.—*Paspalum difforme.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type.)

FIGURE 1259.—Distribution of *Paspalum difforme.*

FIGURE 1261.—Distribution of *Paspalum floridanum.*

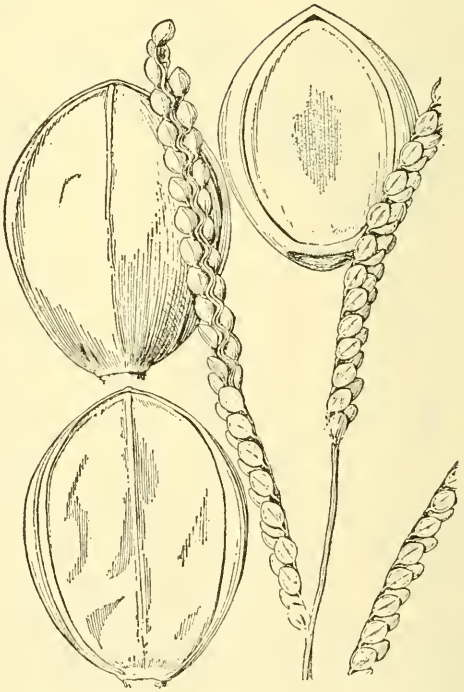

FIGURE 1260.—*Paspalum floridanum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Chase 4221, Fla.)

mostly open ground, southern New Jersey to central Florida, west to Texas and southeastern Kansas.

38. Paspalum gigantéum Baldw. (Fig. 1262.) Culms mostly solitary from short scaly rhizomes, erect, 1.5 to 2 m tall; leaves numerous at base; blades elongate, 10 to 20 mm wide, glabrous or nearly so; racemes commonly 3 or 4, 10 to 20 cm long; spikelets oval, about 3.5 mm long, usually russet-tinged. ♃ (*P. longicilium* Nash.) —Moist sandy soil, open ground, stream banks, flatwoods, and hammocks, on the Coastal Plain from Georgia to southern Florida; Mississippi (Biloxi).

FIGURE 1262.—*Paspalum giganteum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type.)

12. Virgáta.—Robust; blades firm with sharp-cutting edges; racemes several to numerous. Mostly tropical species.

39. Paspalum virgátum L. (Fig. 1263.) Culms, in large dense clumps, erect, 1 to 2 m tall; sheaths papillose-hirsute at margin and summit; blades elongate, flat, 1 to 2.5 cm wide; panicle slightly nodding, 15 to 25 cm long; racemes usually 10 to 16, ascending or drooping, 5 to 15 cm long; spikelets crowded, obovate, about 2.2 to 2.5 mm long, brownish, pubescent along the margin at least toward the summit. ♃ —Open, mostly moist or swampy ground, southern Texas (Brownsville) to South America; throughout the West Indies.

FIGURE 1263.—*Paspalum virgatum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Hitchcock 9555, Jamaica.)

13. **Plicátula.**—Perennials and annuals with compressed purplish culms; blades flat or folded; racemes few to several; spikelets rather turgid, drab, turning brown or dark olivaceous; fruit dark brown, shining.

40. **Paspalum plicátulum** Michx. (Fig. 1264.) Culms in small tufts with numerous leafy shoots, suberect, 50 to 100 cm tall; blades folded at base, usually flat above, rather firm, elongate, 3 to 10 mm wide, usually pilose near base; racemes mostly 3 to 10, arcuate-spreading, 3 to 10 cm long; spikelets usually 2.5 to 2.8 mm long, obovate-oval, brown at maturity, glabrous or the glume appressed-pubescent, the sterile lemma with short transverse wrinkles just inside the slightly raised margin. 2l —Open ground or wet wood borders, Georgia and Florida to Texas, south to Argentina; throughout the West Indies (fig. 1265).

FIGURE 1264.—*Paspalum plicatulum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Chase 7061, Ga.)

FIGURE 1265.—Distribution of *Paspalum plicatulum.*

41. **Paspalum boscián um** Flügge. BULL PASPALUM. (Fig. 1266.) Rather succulent annual, branching at base and commonly from the middle nodes, usually conspicuously brownish purple, glabrous as a whole; culms 40 to 60 cm long, ascending or widely spreading; sheaths broad, loose; blades 10 to 40 cm long, 8 to 15 mm wide, papillose-pilose on upper surface near base; racemes 4 to 12, usually 4 to 7 cm long; rachis 2 to 2.5 mm wide; spikelets crowded, obovate-orbicular, 2 to 2.2 mm long, glabrous, rust-brown at maturity.

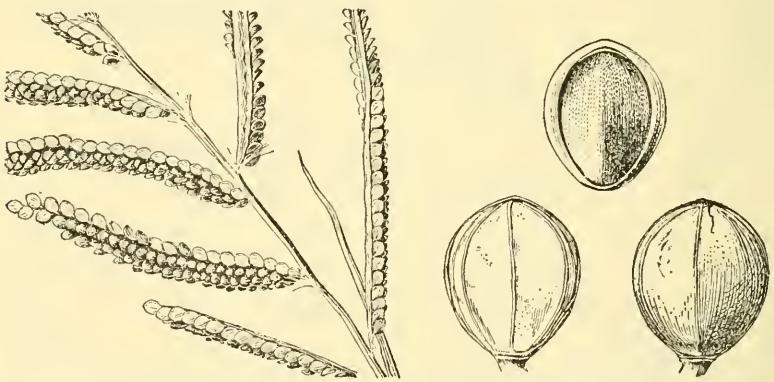

FIGURE 1266.—*Paspalum boscianum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Kearney 152, Fla.)

⊙ (Depauperate specimens have been described as *P. scrobiculatum* L.)—Moist or wet open ground, along ditches and ponds, sometimes a weed in cultivated fields, Pennsylvania (ballast), Virginia to Florida, Louisiana, and Arkansas, south to Brazil (fig. 1267).

Paspalum scrobiculátum L. Stouter and with larger spikelets, unequally biconvex, the sterile lemma loose and wrinkled. ⊙ —Ballast, Camden, N.J.; Abilene, Tex.; Asia.

14. Bífida.—A single species approaching *Panicum*; spikelets turgid; a minute first glume usually developed.

FIGURE 1267.—Distribution of *Paspalum boscianum.*,

42. Paspalum bífidum (Bertol.) Nash. (Fig. 1268.) Culms erect from short rhizomes, 50 to 120 cm tall; blades flat, 10 to 50 cm long, 3 to 14 mm wide, villous to nearly glabrous; racemes usually 3 or 4, at first erect, 4 to 16 cm long; rachis slender, subflexuous; spikelets distant to irregularly approximate, elliptic-obovate, 3.3 to 4 mm long; second glume and sterile lemma conspicuously nerved. ♃ —Sandy pine and oak woods, occasionally in hammocks, nowhere common, on the Coastal Plain from South Carolina to Texas and Oklahoma (fig. 1269).

FIGURE 1268.—*Paspalum bifidum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Curtiss 5590, Fla.)

129. PÁNICUM L. PANICUM

Spikelets more or less compressed dorsiventrally, in open or compact panicles, rarely racemes; glumes 2, herbaceous, nerved, usually very unequal, the first often minute, the second typically equaling the sterile lemma, the latter of the same texture and simulating a third glume, bearing in its axil a membranaceous or hyaline palea and sometimes a staminate flower, the palea rarely wanting; fertile lemma chartaceous-indurate, typically obtuse, the nerves obsolete, the margins inrolled over an enclosed palea of the same texture. Annuals or perennials of various habit. Type species, *Panicum miliaceum*. *Panicum*, an old Latin name for the common millet (*Setaria italica*).

Panicum miliaceum, proso millet, is cultivated to a limited extent in this country for forage. In Europe it is sometimes cultivated for the seed which is used for food. Two species are commonly cultivated in the lowland tropics for forage, *P. maximum*, Guinea grass, an African species, said to have been introduced into Jamaica in 1774, and *P. purpurascens*, Para grass, introduced into Brazil from Africa. Certain native species are constituents of wild hay or of the range. *P. virgatum*, switch grass, of the eastern half of the United States,

FIGURE 1269.—Distribution of *Paspalum bifidum.*

P. bulbosum and *P. obtusum*, of the Southwest, and *Panicum texanum* in Texas, furnish hay or forage. The seeds of *P. sonorum* Beal, of Northwest Mexico, are used for food by the Cocopa Indians.

Axis of branchlets extending beyond the base of the uppermost spikelet as a point or bristle 1 to 6 mm long---------- Subgenus 1. Paurochaetium.
Axis of branchlets not extending into a bristle. (In *P. geminatum* and *P. paludivagum* the somewhat flattened axis is pointed but not bristle-form.)
Basal leaves usually distinctly different from those of the culm, forming a winter rosette; culms at first simple, the spikelets of the primary panicle not perfecting seed, later usually becoming much branched, the small secondary panicles with cleistogamous fruitful spikelets.
Subgenus 2. Dichanthelium.
Basal leaves similar to the culm leaves, not forming a winter rosette; spikelets all fertile---------- Subgenus 3. Eupanicum

Subgenus 1. Paurochaetium

Blades elongate, usually more than 15 cm long, narrowed toward the base.
Spikelets about 3.5 mm long---------- 3. P. reverchoni.
Spikelets about 2 mm long, or less---------- 1. P. chapmani.
Blades usually less than 10 cm long, not narrowed toward the base; spikelets 2.5 to 3 mm long.
Blades of midculm long-acuminate, usually 2 to 3 mm wide.
2. P. ramisetum.
Blades of midculm abruptly acute, usually 4 to 6 mm wide.
4. P. firmulum.

Subgenus 2. Dichanthelium

Blades elongate, not more than 5 mm wide, 20 times as long as wide; autumnal phase branching from the base only (from the lower nodes in *P. werneri*).
1. Depauperata.
Blades not elongate (or if so, more than 5 mm wide and autumnal phase not branching from base).
Plants branching from the base, finally forming rosettes or cushions, the foliage soft, lax. Blades prominently ciliate except in *P. laxiflorum*.
2. Laxiflora.
Plants branching from the culm nodes or rarely remaining simple.
Blades long, stiff; autumnal phase bushy-branched above.
Spikelets turgid, attenuate at base; mostly pustulose-pubescent; blades conspicuously striate, tapering from base to apex- 3. Angustifolia.
Spikelets scarcely turgid, not attenuate at base; blades tapering to both ends---------- 4. Bicknelliana.
Blades not long and stiff (somewhat so in *P. oligosanthes*, *P. malacon*, *P. commonsianum*, and *P. equilaterale*); not bushy-branched.
Plants not forming a distinct winter rosette; spikelets attenuate at base, papillose---------- 14. Pedicellata.
Plants forming a distinct winter rosette; spikelets not attenuate at base.
Spikelets turgid, blunt, strongly nerved (not strongly turgid in *P. oligosanthes*); blades rarely as much as 1.5 cm wide (sometimes 2 cm in *P. ravenellii* and *P. xanthophysum*).
Sheaths or some of them, papillose-hispid (sometimes all glabrous in *P. helleri*); spikelets 3 to 4 mm long (2.7 to 3 mm in *P. wilcoxianum*)---------- 13. Oligosanthia.
Sheaths glabrous or minutely puberulent; spikelets 1.5 to 2.5 mm long, asymmetrically pyriform. Culms wiry------ 12. Lancearia.
Spikelets not turgid, blunt, nor strongly nerved (somewhat so in *P. roanokense* and *P. caerulescens*).
Ligule of conspicuous hairs, usually 3 to 5 mm long.
Sheaths glabrous or only the lowermost somewhat pubescent.
7. Spreta.
Sheaths strongly pubescent---------- 8. Lanuginosa.
Ligule obsolete or nearly so (manifest in *P. oricola*, *P. tsugetorum*, and *P. curtifolium*).

Spikelets nearly spherical at maturity; blades glabrous, firm, cordate.
Plants sparingly branching---------- 10. SPHAEROCARPA.
Spikelets usually obovate or elliptic.
Blades of midculm elongate, less than 1.5 cm wide. Culms usually tall; spikelets pointed, abruptly so in the velvety *P. scoparium*---------- 15. SCOPARIA.
Blades of midculm not elongate (somewhat so in *P. equilaterale*).
Blades cordate, 1 to 3 cm wide (5 to 12 mm in *P. ashei*). Spikelets pubescent.
Spikelets 2.5 to 3 mm long. Sheaths glabrous or minutely puberulent---------- 16. COMMUTATA.
Spikelets 3 to 5 mm long (sometimes but 2.7 mm long in the hispid-sheathed *P. clandestinum*)----- 17. LATIFOLIA.
Blades not cordate, less than 1 cm wide.
Sheaths crisp- or appressed-pubescent. Blades firm; spikelets pubescent---------- 9. COLUMBIANA.
Sheaths glabrous or ciliate only in autumnal phase (sparsely pilose in *P. curtifolium* and the lower velvety in *P. mattamuskeetense*).
Vernal culms delicate (sometimes scarcely so in *P. albomarginatum* and *P. tenue*); spikelets 1.5 mm or less long (1.6 to 1.7 mm in *P. tenue*)--- 11. ENSIFOLIA.
Vernal culms slender but not delicate, rarely less than 40 cm tall; spikelets 2 to 2.9 mm long (1.5 mm in *P. microcarpon* and *P. caerulescens*).
Lower internodes short, upper elongate, producing a nearly naked culm, leafy at base; spikelets narrowly ovate, 2.7 to 2.9 mm long------ 5. NUDICAULIA.
Lower internodes not shorter, the vernal culms about evenly leafy throughout; spikelets elliptic or obovate, not more than 2.5 mm long. 6. DICHOTOMA.

1. Depauperata

Spikelets about 3.5 mm long, beaked---------- 5. P. DEPAUPERATUM.
Spikelets 3 mm long or less, (sometimes 3.2 mm long in *P. perlongum*) not beaked.
Culms single or few in a tuft; spikelets turgid, blunt, 2.7 to 3.2 mm long. prairie plants---------- 6. P. PERLONGUM.
Culms in large tufts; spikelets not turgid, 2.2 to 2.7 mm long; plants of dry woods.
Sheaths pilose; spikelets 2.2 to 2.7 mm long, pilose-- 7. P. LINEARIFOLIUM.
Sheaths glabrous; spikelets 2.2 to 2.3 mm long, glabrous or sparingly pilose. 8. P. WERNERI.

2. Laxiflora

Sheaths retrorsely pilose; spikelets papillose-pilose.
Blades ciliate and more or less pilose on the surface; spikelets 2 mm long. 10. P. XALAPENSE.
Blades glabrous or nearly so on the surface and margin; spikelets 2.2 mm long. 9. P. LAXIFLORUM.
Sheaths not retrorsely pilose; spikelets pubescent or glabrous.
Spikelets pubescent, about 2 mm long---------- 11. P. CILIATUM.
Spikelets glabrous.
Blades glabrous on the surface---------- 12. P. POLYCAULON.
Blades pilose on the surface---------- 13. P. STRIGOSUM.

3. Angustifolia

Nodes bearded; plants grayish-villous; autumnal blades flat.
Spikelets 2 mm long---------- 15. P. CHRYSOPSIDIFOLIUM.
Spikelets 2.5 to 2.8 mm long---------- 16. P. CONSANGUINEUM.
Nodes not bearded; plants villous only at base, or nearly glabrous; autumnal blades involute or flat.
Autumnal blades flat; lower panicle branches spreading or reflexed. 17. P. ANGUSTIFOLIUM.

Autumnal blades involute; lower panicle branches more or less ascending.
Spikelets 3.3 to 3.5 mm long, pointed---- 18. P. FUSIFORME.
Spikelets less than 3 mm long, not pointed, or obscurely so.
Plants glabrous or nearly so. Autumnal culms erect.
Spikelets subsecund along the suberect panicle branches.
21. P. NEURANTHUM.
Spikelets not subsecund, the panicle loose and open-- 20. P. OVINUM.
Plants pubescent, at least on the lower half.
Spikelets about 2.4 mm, rarely only 2.1 mm long; vernal blades 7 to 12 cm long; autumnal blades not falcate--- 19. P. ARENICOLOIDES.
Spikelets not more than 2 mm long; vernal blades 4 to 6 cm long; autumnal blades much crowded, falcate------ 14. P. ACICULARE.

4. Bicknelliana

Spikelets 2.5 to 2.8 mm long; blades not more than 9 mm wide.
22. P. BICKNELLII.
Spikelets 3 mm long; blades as much as 12 mm wide--- 23. P. CALLIPHYLLUM.

5. Nudicaulia

A single species---- 24. P. NUDICAULE.

6. Dichotoma

1a. Nodes, at least the lower, bearded.
Spikelets 1.5 to 1.6 mm long, glabrous (occasional individuals with pubescent spikelets)---- 25. P. MICROCARPON.
Spikelets 2 mm long or more.
Spikelets glabrous, 2 mm long; autumnal phase topheavy-reclining.
32. P. BARBULATUM.
Spikelets pubescent.
Blades all velvety; autumnal phase usually sparingly branching.
27. P. ANNULUM.
Blades glabrous, or only the lower pubescent or velvety; autumnal phase freely branching.
Spikelets 2 mm long; autumnal phase profusely branching.
26. P. NITIDUM.
Spikelets 2.2 mm long or more; autumnal phase less profusely branching.
Sheaths and upper nodes glabrous---- 29. P. CLUTEI.
Lower sheaths and all nodes pubescent.
28. P. MATTAMUSKEETENSE.

1b. Nodes not bearded.
2a. Spikelets pubescent.
Culms erect, never becoming vinelike.
Primary blades spreading; panicles purplish; fruit exposed at summit.
29. P. CLUTEI.
Primary blades erect; panicles green; fruit covered (wood forms with spreading blades may be distinguished from *P. dichotomum* by pubescent spikelets, 2.2 mm long)---- 30. P. BOREALE.
Culms soon prostrate, vinelike, the branches divaricate.
Plants bright green, culms lax; spikelets not more than 2.1 mm long.
36. P. LUCIDUM.
Plants grayish green, culms stiff; spikelets 2.5 mm long.
37. P. SPHAGNICOLA.
2b. Spikelets glabrous.
Culms soon prostrate.
Plants bright green, culms lax; spikelets not more than 2.1 mm long.
36. P. LUCIDUM.
Plants grayish green, culms stiff; spikelets 2.5 mm long.
37. P. SPHAGNICOLA.
Culms erect, or the autumnal phase topheavy, never prostrate.
Spikelets not more than 1.6 mm long; panicles narrow. Plants glaucous bluish green---- 35. P. CAERULESCENS.
Spikelets 2 mm long or more; panicles open.
Blades erect, firm; spikelets turgid, strongly nerved. Plants grayish olive green---- 34. P. ROANOKENSE.

Blades spreading; spikelets not turgid.
Spikelets 2.2 mm long or more, pointed. Sheaths bearing pale glandular spots---------- 33. P. YADKINENSE.
Spikelets not more than 2 mm long, not pointed.
Autumnal phase erect, branched like a little tree; primary blades rarely more than 5 mm wide; second glume shorter than fruit and sterile lemma---------- 31. P. DICHOTOMUM.
Autumnal phase topheavy-reclining; primary blades 6 to 10 mm wide; second glume equaling fruit and sterile lemma. 32. P. BARBULATUM.

7. Spreta

Panicle narrow, one-fourth to one-third as wide as long------ 38. P. SPRETUM.
Panicle open, two-thirds as wide as long, or more.
Spikelets 1.5 mm long---------- 39. P. LINDHEIMERI.
Spikelets 1.3 mm long or less.
Culms and sheaths glabrous---------- 41. P. LONGILIGULATUM.
Culms and sheaths appressed-pubescent.
Spikelets 1.2 to 1.3 mm long---------- 40. P. LEUCOTHRIX.
Spikelets not more than 1 mm long---------- 42. P. WRIGHTIANUM.

8. Lanuginosa

1a. Spikelets not more than 2 mm long.
2a. Plants grayish, velvety-pubescent.
Spikelets 1.4 to 1.5 mm long; autumnal blades involute-pointed (see also *P. albemarlense*)---------- 49. P. AUBURNE.
Spikelets 1.8 to 2 mm long; autumnal blades flat.
Plants dark or olive green when dry; spikelets 1.9 to 2 mm long. 50. P. THUROWII.
Plants light or yellow green when dry.
Autumnal phase prostrate, branching from base and lower nodes, forming close mats; blades not ciliate. Around hot springs. 55. P. THERMALE.
Autumnal phase ascending or spreading, branching from middle and upper nodes, the reduced, fascicled blades strongly ciliate. 48. P. LANUGINOSUM.
2b. Plants pubescent, often villous, but not velvety.
3a. Culms conspicuously pilose with long, horizontally spreading hairs. Culms branching before expansion of primary panicles. 51. P. PRAECOCIUS.
3b. Culms variously pubescent, if pilose the hairs not long and horizontally spreading.
4a. Vernal blades glabrous or nearly so on the upper surface, firm in texture.
Autumnal culms branching from the lower nodes, forming a spreading bunch 10 to 15 cm high; Pacific slope------ 53. P. OCCIDENTALE.
Autumnal culms branching from the middle nodes, forming widely spreading mats; Atlantic slope (see also form of *P. huachucae* var. *fasciculatum*)---------- 47. P. TENNESSEENSE.
4b. Vernal blades pubescent on upper surface, sometimes pilose near base and margins only.
5a. Spikelets 1.3 to 1.5 mm long; vernal blades long-pilose on upper surface.
Autumnal phase widely decumbent-spreading, forming a mat; vernal culms soon geniculate-spreading; plants olivaceous. 44. P. ALBEMARLENSE.
Autumnal phase erect or leaning, never forming a mat; plants yellowish green.
Axis of panicle pilose, panicle branches tangled, the lower drooping. 45. P. IMPLICATUM.
Axis of panicle puberulent only, panicle branches not tangled, the lower ascending---------- 43. P. MERIDIONALE.
5b. Spikelets 1.6 to 2 mm long; vernal blades pilose or pubescent.
Upper surface of blades pilose; spikelets 1.8 to 2 mm long; autumnal phase decumbent-spreading.
Spikelets pointed; culms weak and lax------ 56. P. LANGUIDUM.

Spikelets obtuse; culms not weak and lax.
Culms leafy below, branching from base and lower nodes; Maine to Minnesota ..... 52. P. SUBVILLOSUM.
Culms evenly leafy, branching from upper nodes; Pacific slope. 54. P. PACIFICUM.
Upper surface of blades appressed-pubescent or pilose toward the base only; spikelets 1.6 to 1.8 mm long; autumnal phase not decumbent-spreading ..... 46. P. HUACHUCAE.

1b. Spikelets 2.2 mm long or more.
Spikelets 2.2 to 2.4 mm long.
Pubescence on culms horizontally spreading; autumnal phase freely branching ..... 57. P. VILLOSISSIMUM.
Pubescence on culms appressed or ascending; autumnal phase rather sparingly branching.
Upper internodes shortened, the leaves approximate, the blades often equaling the panicle; pubescence sparse and stiff .. 60. P. SCOPARIOIDES.
Upper internodes not shortened, the copious pubescence silky. 58. P. PSEUDOPUBESCENS.
Spikelets 2.7 to 2.9 mm long.
Culms stiff; blades conspicuously ciliate; southern Atlantic coast. 59. P. OVALE.
Culms weak; blades not ciliate; Pacific coast ..... 61. P. SHASTENSE.

9. Columbiana

1a. Spikelets 2 to 3.2 mm long, mostly elliptic.
Winter blades 5 to 10 cm long. Spikelets 2 mm long; plants blue-green. 66. P. WILMINGTONENSE.
Winter blades 1 to 3 cm long.
Spikelets 3.2 mm long; first glume conspicuously distant .. 62. P. MALACON.
Spikelets not more than 2.9 mm long; first glume not distant.
Spikelets 2.8 to 2.9 mm long; vernal blades 8 to 15 cm long. 63. P. DEAMII.
Spikelets not more than 2.4 mm long; vernal blades not more than 8 cm long.
Spikelets about 2.4 mm (2.2 to 2.4 mm) long; panicle open, the branches stiffly spreading ..... 64. P. COMMONSIANUM.
Spikelets 2 to 2.1 mm long; panicle rather dense, the branches ascending. 65. P. ADDISONII.

1b. Spikelets not more than 1.9 mm long, obovate, turgid.
Culms crisp-puberulent or appressed-pubescent with crimped hairs; plants bluish or grayish green; panicle about 3 to 7 cm long.
Spikelets 1.8 to 1.9 mm long ..... 67. P. TSUGETORUM.
Spikelets 1.5 to 1.6 mm long ..... 68. P. COLUMBIANUM.
Culms appressed or ascending-pilose; plants olivaceous; panicle rarely more than 3 cm long. Spikelets not more than 1.5 mm long, rounded and turgid.
Spikelets 1.5 mm long; culms rather stout; autumnal phase branching from all the nodes ..... 69. P. ORICOLA.
Spikelets 1.3 to 1.4 mm long; culms very slender; autumnal phase with branches mostly aggregate toward the summit. 68. P. COLUMBIANUM var. THINIUM.

10. Sphaerocarpa

Culms spreading; blades obscurely nerved; panicle nearly as broad as long. 70. P. SPHAEROCARPON.
Culms erect or ascending; blades rather strongly nerved; panicle never more than two-thirds as broad as long, usually less.
Spikelets 1.5 to 1.6 mm long; blades lanceolate, the upper not reduced. 71. P. POLYANTHES.
Spikelets 1 to 1.2 mm long; blades tapering from base to apex, the upper much smaller than the lower ..... 72. P. ERECTIFOLIUM.

11. Ensifolia

Ligules about 1 mm long; sheaths or some of them sparsely spreading-pilose. 80. P. CURTIFOLIUM.
Ligules obsolete or nearly so; pubescence if present not spreading.
Blades prominently white-margined, firm; spikelets densely puberulent.
Blades puberulent beneath, often above; sheaths and sometimes lower internodes ascending-pubescent---------- 73. P. TENUE.
Blades glabrous; sheaths glabrous or minutely ciliate only.
Uppermost culm blades much reduced; culms branching from lower nodes only, the branches repeatedly branching- 74. P. ALBOMARGINATUM.
Uppermost culm blades about as long as the others; culms bearing short branches from the upper and middle nodes----- 75. P. TRIFOLIUM.
Blades not white-margined or very obscurely so (or if white margin evident spikelets only 1.1 mm long); spikelets glabrous or puberulent.
Culms branching only at base; plants soft, light green-- 79. P. VERNALE.
Culms branching at the nodes; plants firm or at least not soft.
Spikelets glabrous.
Spikelets 1.1 to 1.2 mm long; blades rarely as much as 5 cm long. 81. P. CHAMAELONCHE.
Spikelets 1.2 to 1.5 mm long.
Blades elongate, at least some of them 8 to 10 cm long. 82. P. GLABRIFOLIUM.
Blades not more than 3 cm long---------- 78. P. ENSIFOLIUM.
Spikelets puberulent.
Spikelets 1.1 mm long. Winter blades bluish green, not glossy. 77. P. CONCINNIUS.
Spikelets 1.3 to 1.5 mm long.
Blades involute, falcate, with long stiff hairs on margin near base. Plants stiff and wiry---------- 83. P. BREVE.
Blades not involute, or at tip only, not falcate.
Plants bright green; winter blades conspicuous, glossy green. 76. P. FLAVOVIRENS.
Plants olive; winter blades not conspicuous nor glossy. 78. P. ENSIFOLIUM.

12. Lancearia

Spikelets, 1.5 to 1.6 mm long---------- 84. P. PORTORICENSE.
Spikelets 2 mm long or more.
Blades, or some of them at least 8 mm wide, glabrous on the upper surface; fruit papillose-roughened---------- 87. P. WEBBERIANUM.
Blades not more than 6 mm wide (or if wider, puberulent on the upper surface); fruit smooth and shining.
Spikelets 2.4 to 2.6 mm long. Blades narrowed toward the base. 88. P. PATENTIFOLIUM.
Spikelets not more than 2.1 mm long.
Blades firm, glabrous above; culms stiffly ascending- 85. P. LANCEARIUM.
Blades lax, softly puberulent on both surfaces; culms decumbent. 86. P. PATULUM.

13. Oligosanthia

Nodes bearded; blades velvety-pubescent beneath.
Plants lax, soft-velvety throughout; spikelets not more than 3 mm long. 90. P. MALACOPHYLLUM.
Plants stiff, pubescence harsh; spikelets about 4 mm long- 94. P. RAVENELII.
Nodes not bearded (or but obscurely so in *P. wilcoxianum*); blades not velvety.
Panicle narrow, branches erect, or spreading only at anthesis. Blades erect.
Spikelets not more than 3 mm long; blades not more than 6 mm wide. 89. P. WILCOXIANUM.
Spikelets 3.7 to 4 mm long; blades 8 to 20 mm wide.
Blades papillose-hispid---------- 95. P. LEIBERGII.
Blades glabrous on both surfaces---------- 96. P. XANTHOPHYSUM.
Panicle about as wide as long.
Spikelets narrowly obovate, subacute; plants olivaceous, appressed-pubescent---------- 93. P. OLIGOSANTHES.
Spikelets broadly obovate, turgid, blunt; plants green, the pubescence, if present, not appressed.
Blades erect, not more than 6 mm wide; plants copiously hirsute throughout---------- 89. P. WILCOXIANUM.

Blades ascending or spreading, rarely less than 8 mm wide, usually wider; plants not hirsute throughout.
Spikelets 3.2 to 3.3 mm long; blades firm; sheaths or some of them more or less hispid---- 92. P. SCRIBNERIANUM.
Spikelets not more than 3 mm long; blades rather thin; sheaths or some of them glabrous or sparsely hispid--- 91. P. HELLERI.

14. Pedicellata

Culms erect or leaning; blades thin, 5 to 9 cm long, narrowed toward the base. 97. P. PEDICELLATUM.
Culms decumbent; blades thick, not more than 5 cm long, not narrowed toward the base---- 98. P. NODATUM.

15. Scoparia

Pubescence soft-villous or velvety. Spikelets abruptly pointed. 99. P. SCOPARIUM.
Pubescence when present not velvety.
Spikelets elliptic; fruit 2 mm long---- 100. P. ACULEATUM.
Spikelets ovate, that is, broadest below the middle; fruit 2 mm long or less.
Sheaths or some of them hispid, rarely glabrous; autumnal phase with crowded branchlets---- 101. P. SCABRIUSCULUM.
Sheaths glabrous; autumnal phase sparingly branching. 102. P. CRYPTANTHUM.

16. Commutata

Plants glaucous, glabrous. Basal blades conspicuously ciliate; vernal culms usually solitary---- 105. P. MUTABILE.
Plants not glaucous.
Blades nearly linear, that is, with parallel margins. First glume about half as long as the spikelet---- 107. P. EQUILATERALE.
Blades lanceolate.
Culms crisp-puberulent; blades usually rigid, symmetrical, rarely more than 10 mm wide; spikelets about 2.5 mm long---- 103. P. ASHEI.
Culms glabrous or softly puberulent; blades firm or lax; spikelets 2.7 to 3.2 mm long.
Culms erect, or autumnal phase leaning; blades symmetrical, broadly cordate---- 104. P. COMMUTATUM.
Culms decumbent; blades usually asymmetrical and falcate, narrowed to the scarcely cordate base---- 106. P. JOORII.

17. Latifolia

Sheaths strongly papillose-hispid, at least the lower and those of the branches. 108. P. CLANDESTINUM.
Sheaths glabrous or softly villous.
Nodes glabrous; spikelets 3.4 to 3.7 mm long---- 109. P. LATIFOLIUM.
Nodes bearded; spikelets 4 to 4.5 mm long---- 110. P. BOSCII.

Subgenus 3. Eupanicum

1a. Plants annual.
Inflorescence consisting of several more or less secund spikelike racemes. Fruit transversely rugose---- 3. FASCICULATA.
Inflorescence a more or less diffuse panicle.
Spikelets tuberculate---- 12. VERRUCOSA.
Spikelets not tuberculate.
First glume not more than one-fourth the length of the spikelet, truncate or triangular-tipped---- 4. DICHOTOMIFLORA.
First glume usually as much as half the length of the spikelet, acute or acuminate---- 5. CAPILLARIA.
1b. Plants perennial.
2a. Spikelets short-pediceled along one side of the rachises, forming spikelike racemes (compare Agrostoidia with 1-sided but not spikelike panicle branches).
First glume nearly equaling the sterile lemma.
Racemes spreading; fruit not more than one-third the length of the spikelet---- 16. GYMNOCARPA.
Racemes appressed; fruit nearly as long as the spikelet---- 14. OBTUSA.

First glume much shorter than the sterile lemma.
Fruit transversely rugose.
Nodes glabrous---- 1. GEMINATA.
Nodes bearded---- 2. PURPURASCENTIA.
Fruit not rugose---- 15. HEMITOMA.
2b. Spikelets in open or sometimes contracted or congested panicles (somewhat 1-sided in Agrostoidia).
Fruit transversely rugose (obscurely so in *P. plenum*)---- 7. MAXIMA.
Fruit not transversely rugose.
Spikelets villous---- 13. URVILLEANA.
Spikelets glabrous.
Sterile palea enlarged and indurate at maturity, expanding the spikelet.
Blades scarcely wider than their sheaths; spikelets about 2.3 mm long, borne toward the ends of the few slender branches- 11. LAXA.
Sterile palea, if present, not enlarged.
Plants with conspicuous creeping scaly rhizomes.
Spikelets long-pediceled, not secund, arranged in an open or contracted panicle---- 8. VIRGATA.
Spikelets short-pediceled, more or less secund along the nearly simple panicle branches---- 10. AGROSTOIDIA.
Plants without creeping scaly rhizomes.
Panicles narrow and few-flowered; culms erect and wiry. Blades drying involute---- 9. TENERA.
Panicles open or contracted, many-flowered.
Spikelets short-pediceled along the nearly simple panicle branches---- 10. AGROSTOIDIA.
Spikelets long-pediceled, the panicle open---- 6. DIFFUSA.

1. Geminata

Spikelets 3 mm long; glumes and sterile lemma papery-- 112. P. PALUDIVAGUM.
Spikelets not more than 2.4 mm long; glumes and sterile lemma not papery.
111. P. GEMINATUM.

2. Purpurascentia

A single species---- 113. P. PURPURASCENS.

3. Fasciculata

Spikelets 5 to 6 mm long---- 118. P. TEXANUM.
Spikelets 2 to 4 mm long.
Spikelets strongly reticulate-veined, 2 to 3 mm long; glabrous.
115. P. FASCICULATUM.
Spikelets scarcely reticulate-veined or only near apex.
Spikelets not more than 2 mm long, glabrous---- 114. P. REPTANS.
Spikelets more than 3 mm long, pubescent.
Rachis scabrous but not bristly---- 116. P. ADSPERSUM.
Rachis bristly-hirsute---- 117. P. ARIZONICUM.

4. Dichotomiflora

Sheaths glabrous---- 119. P. DICHOTOMIFLORUM.
Sheaths papillose-hispid---- 120. P. BARTOWENSE.

5. Capillaria

Panicles drooping; spikelets 4.5 to 5 mm long---- 130. P. MILIACEUM.
Panicles erect; spikelets not more than 4 mm long.
Panicles more than half the length of the entire plant.
Panicles narrow, usually less than half as broad as long--- 121. P. FLEXILE.
Panicles as broad as long.
Fruit without scar at base---- 125. P. CAPILLARE.
Fruit with a lunate scar at base---- 126. P. HILLMANI.
Panicles not more than one-third the entire height of the plant.
Spikelets not more than 2 mm long, acute but not long-acuminate (see also *P. hirsutum*).
Culms stout; blades about 1 cm wide; spikelets turgid.
122. P. GATTINGERI.

Culms slender; blades not more than 6 mm wide; spikelets not turgid.
Axillary pulvini pilose ..... 123. P. PHILADELPHICUM.
Axillary pulvini glabrous ..... 124. P. TUCKERMANI.
Spikelets 2.7 to 4 mm long, acuminate.
First glume about one-third the length of the spikelet, subacute or blunt ..... 129. P. STRAMINEUM.
First glume usually more than half the length of the spikelet, acuminate.
First glume more than three-fourths the length of the spikelet; spikelets 4 mm long ..... 128. P. PAMPINOSUM.
First glume half to two-thirds the length of the spikelet; spikelets not more than 3.3 mm long ..... 127. P. HIRTICAULE.

6. Diffusa

Second glume and sterile lemma elongate, at least three times as long as the fruit ..... 131. P. CAPILLARIOIDES.
Second glume and sterile lemma not elongate.
Culms as much as 1 cm thick; blades 2 cm wide or more .. 136. P. HIRSUTUM.
Culms slender; blades not more than 1 cm wide.
Spikelets 4 to 4.2 mm long. Midnerves of glumes and sterile lemma scabrous toward the apex ..... 134. P. LEPIDULUM.
Spikelets usually less than 3.5 mm long.
Blades hirsute on both surfaces (sometimes glabrescent), not at all glaucous ..... 135. P. GHIESBREGHTII.
Blades glabrous on both surfaces or with a few hairs on either surface, glaucous above.
Panicle much exceeding the leaves; spikelets 3 to 3.5 mm long (rarely 3.7 mm) ..... 133. P. HALLII.
Panicle usually equaled or exceeded by the uppermost blades; spikelets 2 to 2.6 mm long ..... 132. P. FILIPES.

7. Maxima

Culms with a cormlike base ..... 139. P. BULBOSUM.
Culms not cormlike at base.
Nodes hirsute; ligules 4 to 6 mm long; fruit strongly rugose. 137. P. MAXIMUM.
Nodes glabrous; ligules 2 mm long; fruit obscurely rugose .. 138. P. PLENUM.

8. Virgata

Spikelets not more than 2.5 mm long, first glume less than half the length of the spikelet.
Panicle loosely flowered; first glume truncate, about one-fifth the length of the spikelet ..... 140. P. REPENS.
Panicle rather densely flowered; first glume triangular, about one-third the length of the spikelet ..... 141. P. GOUINI.
Spikelets 3 to 7 mm long (sometimes less than 3 mm in *P. virgatum* var. *cubense*); first glume more than half the length of the spikelet.
Panicle elongate, strongly contracted; seacoast plants.
Culms rarely 1 m tall, solitary from the nodes of the horizontal rhizome ..... 144. P. AMARUM.
Culms 1 to 2 m tall, in dense tufts ..... 145. P. AMARULUM.
Panicle diffuse, or only slightly contracted; plants sometimes of salt marshes but not littoral.
Spikelets 6 to 8 mm long; culms solitary, with a creeping base. 143. P. HAVARDII.
Spikelets less than 5 mm long (in exceptional specimens 6 mm long); culms erect, producing numerous scaly rhizomes ..... 142. P. VIRGATUM.

9. Tenera

A single species ..... 146. P. TENERUM.

10. Agrostoidea

Rhizomes present; culms but little compressed; spikelets set obliquely on the appressed pedicels.
Panicles open; spikelets 3.4 to 3.8 mm long (shorter in exceptional specimens). 152. P. ANCEPS.

Panicles more or less contracted; spikelets not more than 2.8 mm long. 153. P. RHIZOMATUM.
Rhizomes wanting; culms strongly compressed with keeled sheaths; spikelets not obliquely disposed.
Ligule ciliate; basal leaves half as long as the culm or more; panicle much exceeding the upper leaves.
Spikelets not more than 2.7 mm, usually 2.5 mm long, the first glume less than half that length; ligule 2 to 3 mm long-- 150. P. LONGIFOLIUM.
Spikelets 3 to 3.5 mm long; first glume two-thirds to three-fourths that length; ligule less than 1 mm long---------- 151. P. COMBSII.
Ligule erose or lacerate, not ciliate; basal leaves in short tufts, the upper usually nearly equaling the terminal panicle.
Fruit stipitate; spikelets 2.5 to 2.8 mm long, conspicuously secund. 149. P. STIPITATUM.
Fruit not stipitate; spikelets not conspicuously secund.
Spikelets 1.8 to 2 mm, in occasional specimens 2.2 mm long; panicle branches ascending or spreading---------- 147. P. AGROSTOIDES.
Spikelets about 2.5 mm long; panicle branches erect or nearly so. 148. P. CONDENSUM.

11. Laxa

A single species---------- 154. P. HIANS.

12. Verrucosa

Spikelets about 2 mm long, glabrous---------- 155. P. VERRUCOSUM.
Spikelets more than 3 mm long, hispid---------- 156. P. BRACHYANTHUM.

13. Urvilleana

A single species---------- 157. P. URVILLEANUM.

14. Obtusa

A single species---------- 158. P. OBTUSUM.

15. Hemitoma

A single species---------- 159. P. HEMITOMON.

16. Gymnocarpa

A single species---------- 160. P. GYMNOCARPON.

SUBGENUS 1. PAUROCHAÉTIUM Hitchc. and Chase

Perennials; culms tufted, erect, blades not more than 7 mm wide; panicle slender, the branches short, appressed, the ultimate branchlets bearing 1 to several spikelets, produced beyond the uppermost spikelet as a bristle 1 to 6 mm long; spikelets much swollen on the face, glabrous, strongly nerved; fruit transversely rugose, apiculate.

1. Panicum chapmâni Vasey. (Fig. 1270.) Culms ascending or spreading, slender, wiry, 40 to 100 cm tall; blades erect, rather firm, 15 to 40 cm long, 2 to 5 mm wide, more or less involute when dry; panicle mostly 20 to 30 cm long; bristle 3 to 6 mm long; spikelets 2 to 2.2 mm long, obovate; first glume about one-third as long as the spikelet, obtuse or truncate. ♃ —Coral sand and shell mounds, southern Florida; Bahamas; Yucatan.

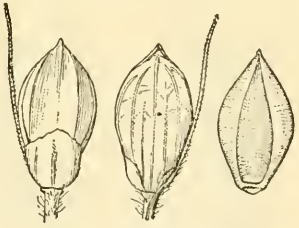

FIGURE 1270.—*Panicum chapmani.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type.)

2. Panicum ramisétum Scribn. (Fig. 1271.) Culms erect or ascending from short horizontal rhizomes, 25 to 60 cm tall; blades 5 to

12 cm long, 2 to 4 mm wide; panicle 5 to 20 cm long; bristle not exceeding the spikelet; spikelets about 2.5 mm long, obovate; first glume about half as long as the spikelet. 2↓ —Sandy plains and prairies, southern Texas and northern Mexico.

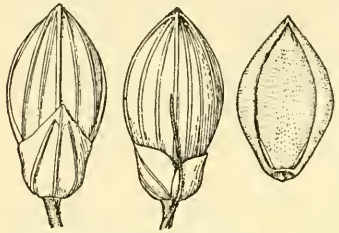

FIGURE 1271.—*Panicum ramisetum.* Two views of spikelet, and floret, × 10. (Type.)

3. Panicum reverchóni Vasey. (Fig. 1272.) Culms stiffly erect, from short rhizomes, 30 to 70 cm tall; blades erect, stiff, 5 to 20 cm long, 2 to 3 mm wide; panicle 5 to 20 cm long; spikelets mostly one to a branchlet, the bristle equaling or exceeding the spikelet; spikelets 3.5 to 3.8 mm long, elliptic; first glume about half as long as the spikelet. 2↓ — Rocky or sandy prairies and limestone hills, Texas.

4. Panicum fírmulum Hitchc. and Chase. (Fig. 1273.) Culms ascending or decumbent at base, 30 to 40 cm tall, rather loosely tufted from creeping knotted rhizomes as much as 5 cm long; blades ascending or spreading, firm, 4 to 10 cm long, 4 to 7 mm wide; bristle 1 to 2 times as long as the spikelet; spikelets 3 to 3.2 mm long, obovate; first glume half as long as the spikelet. 2↓ —Sandy prairies, southern Texas.

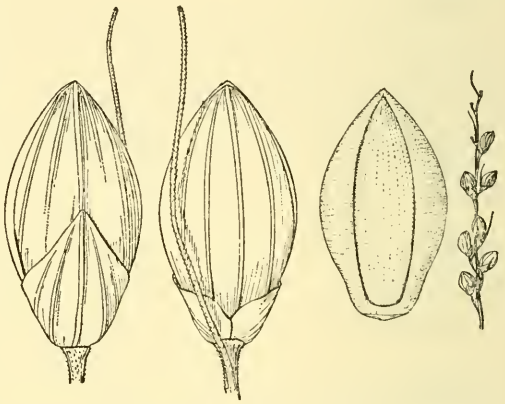

FIGURE 1272.—*Panicum reverchoni.* Panicle, × 1; two views of spikelet, and floret, × 10. (Type.)

SUBGENUS 2. DICHANTHÉLIUM Hitchc. and Chase

Perennial, from a crown, rarely from short matted rhizomes, surrounded by a more or less well-marked rosette of usually short winter leaves, in spring producing simple culms with mostly narrowly lanceolate blades and terminal panicles with numerous spikelets, these rarely perfecting seed; early culms branching at some or all of the nodes (in a few species from the base only) after the maturity of the primary panicles or sometimes before; branches often repeatedly branching, the short branchlets more or less fascicled and bearing usually much reduced leaves; the terminal one or two joints of the primary culm often finally falling, the whole producing an autumnal phase usually strikingly different from the vernal phase; secondary panicles reduced,

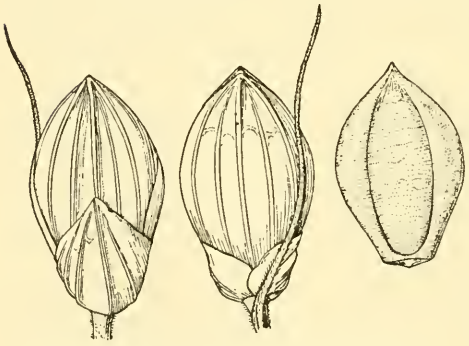

FIGURE 1273.—*Panicum firmulum.* Two views of spikelet, and floret, × 10. (Type.)

the latest more or less included in the sheaths, the spikelets cleistogamous and perfecting their grains. The species of this subgenus are usually known as dichotomous panicums because they are related to *Panicum dichotomum*.

Key to the species irrespective of the groups

1a. Spikelets glabrous.
2a. Spikelets 3 mm long or more, strongly nerved.
Spikelets pointed; blades elongate---- 5. P. DEPAUPERATUM.
Spikelets blunt; blades not elongate.
Spikelets 3.2 to 3.3 mm long; blades firm; sheaths, or some of them, hispid. 92. P. SCRIBNERIANUM.
Spikelets not more than 3 mm long; blades rather thin; sheaths glabrous or sparsely hispid---- 91. P. HELLERI.
2b. Spikelets less than 3 mm long.
3a. Second glume and sterile lemma exceeding the fruit and pointed beyond it. Spikelets 2.2 to 2.9 mm long.
Blades clustered toward the base---- 24. P. NUDICAULE.
Blades not clustered toward the base.
Sheaths, at least the secondary, hispid---- 101. P. SCABRIUSCULUM.
Sheaths glabrous.
Blades firm; fruit 1.5 mm long---- 102. P. CRYPTANTHUM.
Blades thin; fruit nearly 2 mm long---- 33. P. YADKINENSE.
3b. Second glume and sterile lemma not pointed beyond the fruit.
4a. Ligule manifest, 1 to 3 mm long.
Culms rather stout; ligule 2 to 3 mm long; sheaths glabrous. 38. P. SPRETUM.
Culms slender; ligule 1 mm long; sheaths sparsely pilose. 80. P. CURTIFOLIUM.
4b. Ligule obsolete.
5a. Spikelets 1.5 mm or less long.
Nodes bearded---- 25. P. MICROCARPON.
Nodes not bearded.
Culms and blades pilose---- 13. P. STRIGOSUM.
Culms glabrous.
Blades conspicuously ciliate; plants branching at base only. 12. P. POLYCAULON.
Blades not ciliate; plants branching from middle or upper nodes.
Vernal culms 50 cm tall or more; spikelets turgid, strongly nerved; autumnal phase erect, with fascicled branches shorter than the primary internodes. 35. P. CAERULESCENS.
Vernal culms usually much less than 50 cm tall; autumnal phase spreading or reclining.
Spikelets 1.1 to 1.2 mm long. Blades rarely as much as 5 cm long---- 81. P. CHAMAELONCHE.
Spikelets 1.2 to 1.4 mm long.
Blades elongate, at least some of them 8 to 10 cm long. 82. P. GLABRIFOLIUM.
Blades not more than 3 cm long---- 78. P. ENSIFOLIUM.
5b. Spikelets 2 mm long or more.
Blades elongate, some of them 20 times as long as wide; spikelets 2.2 to 2.8 mm long.
Blades erect; branches, when present, from the lower nodes only. 8. P. WERNERI.
Blades spreading; branches from upper nodes---- 22. P. BICKNELLII.
Blades not elongate, about 10 times as long as wide.
Culms soon prostrate, vinelike; branches divaricate.
Plants bright green; culms lax; spikelets not more than 2.1 mm long---- 36. P. LUCIDUM.
Plants grayish green; culms stiff; spikelets 2.5 mm long. 37. P. SPHAGNICOLA.

Culms not vinelike; branches not divaricate.
Spikelets 2.3 to 2.6 mm long.
Blades, or some of them, at least 8 mm wide; fruit papillose-roughened---------- 87. P. WEBBERIANUM.
Blades not more than 6 mm wide; fruit smooth and shining. 88. P. PATENTIFOLIUM.
Spikelets 2 mm long.
Culms wiry, crisp-puberulent; blades ciliate at base. 85. P. LANCEARIUM.
Culms glabrous; blades not ciliate.
Blades erect, firm; spikelets turgid, strongly nerved. Plants grayish olive---------- 34. P. ROANOKENSE.
Blades spreading; spikelets not turgid.
Nodes glabrous; autumnal phase erect, branched like a little tree---------- 31. P. DICHOTOMUM.
Nodes, at least the lowest, usually bearded; autumnal phase topheavy-reclining----- 32. P. BARBULATUM.

1b. Spikelets pubescent.
6a. Spikelets 3 mm or more long.
7a. Blades elongate, those of the midculm at least 15 times as long as wide.
Secondary panicles from basal sheaths only.
Spikelets pointed, about 3.5 mm long---------- 5. P. DEPAUPERATUM.
Spikelets blunt, 3 mm long or less----------6. P. PERLONGUM.
Secondary panicles from upper branches.
Spikelets attenuate at base, pustulose-pubescent; lowermost sheaths softly villous---------- 18. P. FUSIFORME.
Spikelets not attenuate at base, not pustulose; lowermost sheaths glabrous or hispid.
Upper leaves approximate; sheaths glabrous. 107. P. EQUILATERALE.
Upper leaves distant; at least the lower sheaths hispid. 100. P. ACULEATUM.
7b. Blades not elongate, usually less than 10 times as long as wide.
8a. Blades velvety-pubescent beneath.
Spikelets 3 mm long. Plants velvety-villous throughout. 90. P. MALACOPHYLLUM.
Spikelets 4 mm long or more.
Sheaths ascending-hirsute, ligule 3 to 4 mm long. 94. P. RAVENELII.
Sheaths downy-pubescent; ligule obsolete. 110. P. BOSCII var. MOLLE.
8b. Blades not velvety-pubescent beneath.
9a. Sheaths glabrous or minutely puberulent only.
Nodes bearded; spikelets 4 mm long or more----- 110. P. BOSCII.
Nodes not bearded; spikelets not more than 3.8 mm long.
Spikelets 3.5 to 3.8 mm long. Blades 2 cm wide or more. 109. P. LATIFOLIUM.
Spikelets scarcely more than 3 mm long.
Spikelets turgid, blunt; blades mostly less than 1 cm wide. 91. P. HELLERI.
Spikelets not turgid; blades more than 1 cm wide.
Panicle narrow, the branches ascending. Spikelets on long stiff pedicels---------- 23. P. CALLIPHYLLUM.
Panicle as broad as long, the branches spreading.
Plants glaucous; basal blades conspicuously ciliate. 105. P. MUTABILE.
Plants not glaucous; basal blades not ciliate, or at the base only.
Culms erect, or autumnal phase leaning; blades symmetrical, broadly cordate--- 104. P. COMMUTATUM.
Culms decumbent; blades usually unsymmetrical and falcate, narrowed to the scarcely cordate base. 106. P. JOORII.

9b. Sheaths pubescent.
Pubescence ascending or appressed.
Spikelets 3 to 3.2 mm long; first glume conspicuously remote.
62. P. MALACON.
Spikelets 3.5 to 4 mm long; first glume not remote.
93. P. OLIGOSANTHES.
Pubescence spreading, sometimes sparse.
Plants robust, about 1 m tall; blades usually 2 cm or more wide.
108. P. CLANDESTINUM.
Plants rarely more than 50 cm tall; blades rarely more than 1.5 cm wide.
Panicle about as wide as long; blades ascending or spreading.
Spikelets attenuate at base, 3.5 to 4 mm long.
See 14. PEDICELLATA.
Spikelets not attenuate at base, not more than 3.3 mm long.
Spikelets 3.2 to 3.3 mm long; blades firm; sheaths, or some of them, more or less hispid-- 92. P. SCRIBNERIANUM.
Spikelets not more than 3 mm long; blades rather thin; sheaths, or some of them, glabrous or sparsely hispid.
91. P. HELLERI.
Panicle narrow, the branches erect (sometimes ascending in *P. wilcoxianum*), or spreading at anthesis only; blades erect.
Spikelets not more than 3 mm long; blades not more than 6 mm wide---------- 89. P. WILCOXIANUM.
Spikelets 3.7 to 4 mm long; blades 8 to 20 mm wide.
Blades papillose-hispid---------- 95. P. LEIBERGII.
Blades glabrous on both surfaces 96. P. XANTHOPHYSUM.

6b. Spikelets less than 3 mm long.
10a. Blades elongate, not more than 5 mm wide; secondary panicles at the base only or wanting.
Culms single or few in a tuft; spikelets turgid, 2.7 to 3 mm long.
6. P. PERLONGUM.
Culms in large tufts; spikelets not turgid, not more than 2.7 mm long.
Sheaths pilose---------- 7. P. LINEARIFOLIUM.
Sheaths glabrous---------- 8. P. WERNERI.
10b. Blades usually not elongate; secondary panicles not at the base.
11a. Spikelets attenuate at base, mostly prominently pustulose. Blades narrow, stiff, strongly nerved, tapering from base to apex.
Nodes bearded; plants grayish-villous. Autumnal blades flat.
Spikelets 2 mm long---------- 15. P. CHRYSOPSIDIFOLIUM.
Spikelets 2.5 to 2.8 mm long---------- 16. P. CONSANGUINEUM.
Nodes not bearded; plants villous only at the base, or nearly glabrous.
Autumnal blades flat; lower panicle branches spreading or reflexed.
17. P. ANGUSTIFOLIUM.
Autumnal blades involute; lower panicle branches more or less ascending.
Plants glabrous or nearly so; autumnal culms erect.
Spikelets subsecund along the suberect panicle branches.
21. P. NEURANTHUM.
Spikelets not subsecund; panicle loose and open.
20. P. OVINUM.
Plants pubescent, at least on the lower half.
Spikelets about 2.4 mm long; vernal blades 7 to 12 cm long; autumnal blades not falcate------ 19. P. ARENICOLOIDES.
Spikelets not more than 2 mm long; vernal blades 4 to 6 cm long; autumnal blades falcate-------- 14. P. ACICULARE.
11b. Spikelets not attenuate at base.
12a. Sheaths retrorsely pilose. Blades soft and lax.
Blades ciliate and more or less pilose on the surface; spikelets 2 mm long---------- 10. P. XALAPENSE.
Blades glabrous or nearly so on the surface and margin; spikelets 2.2 mm long---------- 9. P. LAXIFLORUM.
12b. Sheaths not retrorsely pilose.
13a. Ligule manifest, mostly 2 to 5 mm long, at least 1 mm long.
Sheaths, or all but the lowest, glabrous; spikelets not more than 1.6 mm long.
Panicle narrow, one-fourth to one-third as wide as long.
38. P. SPRETUM.

Panicle open, nearly as wide as long.
Spikelets 1.5 mm long---------- 39. P. LINDHEIMERI.
Spikelets 1.1 mm long---------- 41. P. LONGILIGULATUM.
Sheaths pubescent.
Ligule 1 mm long. Sheaths sparsely pilose; spikelets 1.4 mm long---------- 80. P. CURTIFOLIUM.
Ligule usually more than 1 mm long.
Ligule 1 to 1.5 mm long. Culms and sheaths appressed-pubescent; spikelets 1.5 mm long or more.
Spikelets 2.8 to 2.9 mm long---------- 63. P. DEAMII.
Spikelets less than 2 mm long.
Spikelets 1.8 to 1.9 mm long; plants bluish green. 67. P. TSUGETORUM.
Spikelets 1.5 mm long, nearly globular; plants olivaceous. 69. P. ORICOLA.
Ligule 2 to 5 mm long.
Spikelets 1 to 1.3 mm long; culms and sheaths softly appressed-pubescent.
Spikelets 1.2 to 1.3 mm long------ 40. P. LEUCOTHRIX.
Spikelets not more than 1 mm long 42. P. WRIGHTIANUM.
Spikelets mostly more than 1.5 mm long, if less, pubescence spreading---------- See 8. LANUGINOSA.

13b. Ligule obsolete or less than 1 mm long.
14a. Nodes bearded (*P. scoparium* may appear to be bearded).
Spikelets nearly 3 mm long; plants velvety-villous throughout. 90. P. MALACOPHYLLUM.
Spikelets rarely as much as 2.5 mm long; plants not pubescent throughout.
Spikelets 1.5 to 1.6 mm long---------- 25. P. MICROCARPON.
Spikelets 2 mm long or more.
Blades all velvety. Autumnal phase usually sparingly branching---------- 27. P. ANNULUM.
Blades glabrous, or only the lower pubescent or velvety.
Spikelets 2 mm long; autumnal phase profusely branching. 26. P. NITIDUM.
Spikelets 2.2 mm long or more; autumnal phase less profusely branching.
Sheaths and upper nodes glabrous---- 29. P. CLUTEI.
Lower sheaths and all nodes pubescent. 28. P. MATTAMUSKEETENSE.

14b. Nodes not bearded.
15a. Plants densely gray-velvety throughout, a viscid, glabrous ring below the nodes---------- 99. P. SCOPARIUM.
15b. Plants not gray-velvety.
16a. Sheaths or some of them pilose or hispid.
Pubescence papillose-hispid.
Spikelets ovate, pointed, 2.3 to 2.6 mm long. 101. P. SCABRIUSCULUM.
Spikelets obovate, obtuse, nearly 3 mm long.
Blades about 2 cm wide----- 108. P. CLANDESTINUM.
Blades not more than 6 mm wide. 89. P. WILCOXIANUM.
Pubescence ascending-pilose.
Spikelets 2.8 to 2.9 mm long---------- 63. P. DEAMII.
Spikelets not more than 2.5 mm long.
Spikelets 2 to 2.5 mm long.
Winter blades elongate, 5 to 10 cm long; plants bluish green. Spikelets 2 mm long. 66. P. WILMINGTONENSE.
Winter blades 1 to 3 cm long; plants olivaceous.
Spikelets about 2.4 mm long; panicle open, branches stiffly spreading. 64. P. COMMONSIANUM.
Spikelets 2 to 2.1 mm long; panicle rather dense, branches ascending------- 65. P. ADDISONII.

Spikelets not more than 1.7 mm long.
Blades white-margined; spikelets 1.6 to 1.7 mm long, elliptic---- 73. P. TENUE.
Blades not white-margined; spikelets 1.3 to 1.4 mm long, nearly globular.
68. P. COLUMBIANUM var. THINIUM.

16b. Sheaths glabrous or puberulent only.
17a. Spikelets spherical, not more than 1.8 mm long. Blades cordate, ciliate at base.
See 10. SPHAEROCARPA.

17b. Spikelets not spherical.
18a. Culms soon prostrate, vinelike; branches divaricate.
Plants bright green; culms lax; spikelets not more than 2.1 mm long---- 36. P. LUCIDUM.
Plants grayish green; culms stiff; spikelets 2.5 mm long.
37. P. SPHAGNICOLA.

18b. Culms not vinelike; branches not divaricate.
19a. Spikelets asymmetrically pyriform, strongly nerved. Culms wiry---- See 12. LANCEARIA.
19b. Spikelets not pyriform.
20a. Blades elongate, especially the upper, about 20 times as long as wide. Spikelets about 2.5 mm long, on long pedicels- 22. P. BICKNELLII.
20b. Blades not elongate. (See continuation.)

(Continuation.)

21a. Spikelets 2 mm long or more.
Spikelets 2.5 to 3 mm long; blades cordate, usually 1 cm or more wide.
Plants glaucous; basal blades conspicuously ciliate---- 105. P. MUTABILE.
Plants not glaucous; basal blades ciliate at base only.
Culms crisp-puberulent; blades rarely more than 1 cm wide; spikelets about 2.5 mm long---- 103. P. ASHEI.
Culms glabrous or obscurely puberulent; blades usually 1.5 cm wide or more; spikelets 2.7 to 3 mm long---- 104. P. COMMUTATUM.
Spikelets not more than 2.3 mm long; blades not cordate, usually less than 1 cm wide.
Blades conspicuously ciliate, soft, lax, crowded at the base.
11. P. CILIATUM.
Blades not ciliate or at base only, not crowded at the base.
Blades not more than 6 mm wide; plants not branching or rarely branching from near the base---- 8. P. WERNERI.
Blades 7 mm wide or more; plants branching from middle and upper nodes.
Primary blades spreading; panicle purplish; fruit exposed at summit.
29. P. CLUTEI.
Primary blades erect; panicle green; fruit covered-- 30. P. BOREALE.

21b. Spikelets not more than 1.7 mm long.
Culms crisp-puberulent. Spikelets turgid---- 68. P. COLUMBIANUM.
Culms glabrous.
Blades white-margined, firm.
Blades puberulent beneath, often above---- 73. P. TENUE.
Blades glabrous.
Uppermost blades much reduced; culms branching from lower nodes only, the branches repeatedly branching.
74. P. ALBOMARGINATUM.
Uppermost blades about as long as the others; culms bearing short branches from middle and upper nodes---- 75. P. TRIFOLIUM.
Blades not white-margined or very obscurely so (or if white margin is evident, spikelets only 1.1 mm long).
Culms branching only at base. Plants soft, light green- 79. P. VERNALE.
Culms branching at the nodes.
Spikelets 1.1 mm long. Winter blades bluish green, not glossy.
77. P. CONCINNIUS.
Spikelets 1.3 to 1.5 mm long.
Blades involute, falcate, with long stiff hairs on margin near base. Plants stiff and wiry---- 83. P. BREVE.
Blades not involute or at tip only, not falcate.
Plants bright green; winter blades conspicuous, glossy green.
76. P. FLAVOVIRENS.
Plants olive; winter blades not conspicuous nor glossy.
78. P. ENSIFOLIUM.

1. Depauperáta.—Ligule less than 1 mm long; blades elongate, the basal ones not forming a distinct rosette in autumn; spikelets strongly 7- to 9-nerved. Autumnal phase with short branches from lower nodes.

5. Panicum depauperátum Muhl. (Fig. 1274.) Vernal phase with culms several to many in a tuft, slender but rather stiff, erect or nearly so; sheaths glabrous or papillose-pilose; blades 6 to 15 cm long, 2 to 5 mm wide, often involute in drying; panicle exserted, usually not much exceeding the leaves, 4 to 8 cm long, few-flowered; spikelets 3.2 to 3.8 mm long, elliptic, pointed, glabrous or sparsely pubescent; second glume and sterile lemma extending beyond the fruit, forming a beak. Autumnal phase similar, the reduced panicles partly concealed in the basal leaves. 2l —Open sterile woods, Quebec and Nova Scotia to Minnesota, south to Georgia and Texas (fig. 1275).

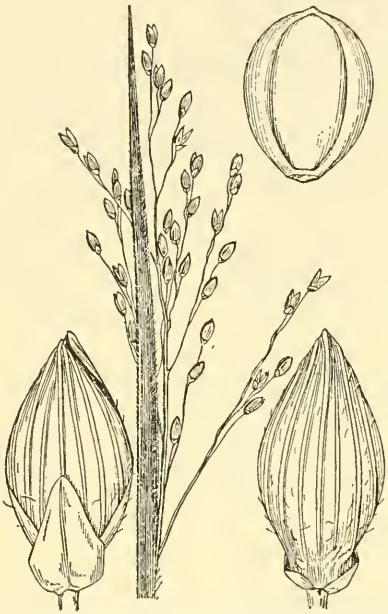

FIGURE 1274.—*Panicum depauperatum.* Panicle, ×1; two views of spikelet, and floret, × 10. (Amer. Gr. Nat. Herb. 78, D.C.)

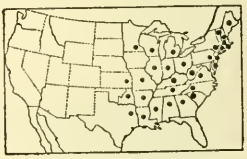

FIGURE 1275.—Distribution of *Panicum depauperatum.*

6. Panicum perlóngum Nash. (Fig. 1276.) Vernal phase similar to that of *P. depauperatum;* the tufts smaller, usually pilose, the panicle narrower; spikelets 2.7 to 3.2 mm long, oval, blunt, sparingly pilose, the glume and sterile lemma not extending beyond the fruit. Autumnal phase similar, the reduced panicles numerous. 2l —Prairies and dry soil, Indiana to Manitoba and North Dakota, south to Colorado and Texas (fig. 1277).

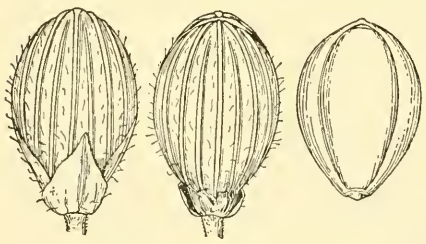

FIGURE 1276.—*Panicum perlongum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1277.—Distribution of *Panicum perlongum.*

7. Panicum linearifólium Scribn. (Fig. 1278.) Vernal phase in dense tufts; culms slender, erect, 20 to 45 cm tall; sheaths papillose-pilose; blades erect, usually overtopping the panicles, 2 to 4 mm wide; panicle long-exserted, 5 to 10 cm long, the flexuous branches ascending; spikelets 2.2 to 2.7 mm long, oblong-elliptic, obtuse, sparsely pilose. Autumnal phase similar, the reduced panicles hidden among the basal leaves. 2l —Dry woods, Quebec and Maine to Michigan, south to Georgia and Texas (fig. 1279).

8. **Panicum wernéri** Scribn. (Fig. 1280.) Vernal phase similar to that of *P. linearifolium*, the culms usually stiffer, blades firmer, shorter and wider (15 cm long or less); nodes usually sparingly pilose; sheaths glabrous; spikelets 2.1 to 2.4 mm long, nearly or quite glabrous. Autumnal phase similar to the vernal, sometimes late in the season bearing simple branches from the lower nodes. 2↓ —Sterile woods and knolls, Quebec and Maine to Minnesota, south to Virginia, Kentucky, and Texas (fig. 1281). Intergrades with *P. linearifolium*.

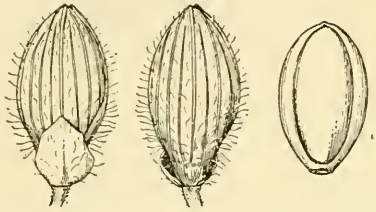

FIGURE 1278.—*Panicum lincarifolium*. Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1279.—Distribution of *Panicum linearifolium*.

2. Laxiflóra.—Tufted, erect to spreading; foliage aggregate toward base, light green, soft, the basal blades not in distinct rosettes in autumn; ligules nearly obsolete; primary panicles long-exserted; spikelets obovate, obtuse, turgid, 5- to 7-nerved. Autumnal phase branching near base, forming close flat tufts, with reduced panicles.

9. Panicum laxiflórum Lam. (Fig. 1282.) Vernal culms 20 to 60 cm tall, erect or geniculate below; nodes bearded with reflexed hairs; sheaths retrorsely pilose; blades 10 to 20 cm long, 7 to 12 mm wide, glabrous or sparsely ciliate; panicle 8 to 12 cm long, lax, few-flowered, the lower branches often reflexed; spikelets 2.2 to 2.3 mm long, papillose-pilose. Autumnal blades scarcely reduced, much exceeding the secondary panicles. 2↓ —Rich or damp woods, South Carolina to Florida and Alabama (fig. 1283).

10. Panicum xalapénse H.B.K. (Fig. 1284.) Vernal culms and blades on the average shorter than in *P. laxiflorum*, the blades pilose on one or both surfaces or nearly glabrous, usually short-ciliate; spike-

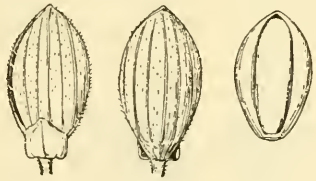

FIGURE 1280.—*Panicum werneri*. Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1281.—Distribution of *Panicum werneri*.

lets 1.9 to 2 mm long, pilose. Autumnal phase with usually denser tufts and shorter blades. 2↓ —Woods, Maryland to Illinois and Missouri, south to Florida and Texas; Mexico; Guatemala; Santa Domingo. Originally described from Xalapa (Jalapa), Mexico (fig. 1285). PANICUM XALAPENSE var. STRICTIRÁMEUM Hitchc. and Chase. Vernal panicles more compact, branches ascending, spikelets 1.7 mm long; blades shorter, narrower. 2↓ —Dry woods, Coastal Plain, South Carolina to Texas.

11. Panicum ciliátum Ell. (Fig. 1286.) Vernal culms 5 to 30 cm tall; sheaths ciliate on the margin; blades 3 to 6 cm long, 3 to 8 mm wide, the uppermost often much smaller, ciliate with stiff hairs 2 to 3 mm long; panicle 3 to 4 cm long, the axis pilose, branches spreading; spikelets 1.8 to 2 mm long, pilose. Autumnal mats with slightly smaller blades. 2↓ —Low pinelands and hammocks, Coastal Plain, North Carolina to Florida and Louisiana; Mexico (fig. 1287).

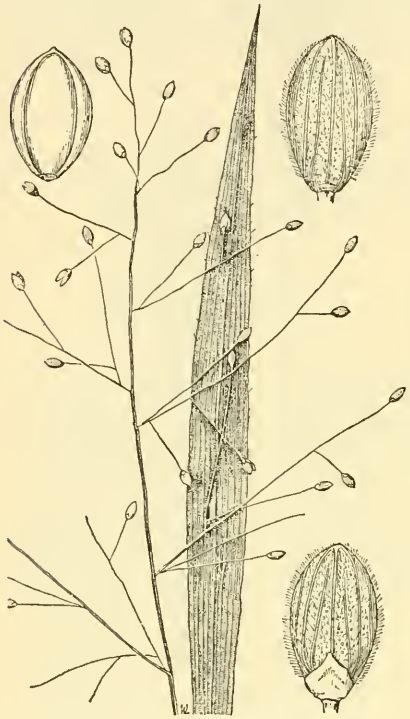

FIGURE 1282.—*Panicum laxiflorum.* Panicle, × 1; two views of spikelet, and floret, × 10. (Curtiss 6635, Fla.)

12. Panicum polycaúlon Nash. (Fig. 1288.) Vernal culms 10 to 20 cm tall; blades mostly narrower than in *P. ciliatum*, panicle similar; spikelets 1.5 to 1.6 mm long (rarely as much as 2 mm), glabrous. Autumnal mats very dense. 2↓ —Low pine woods, Coastal Plain, Florida, Alabama, and Mississippi; West Indies.

13. Panicum strigosum Muhl. (Fig. 1289.) Vernal culms 15 to 30 cm tall, the culms and sheaths sparsely pilose; nodes bearded; blades mostly 5 to 7 mm wide, pilose on both surfaces, stiffly ciliate; panicle 4 to 6 cm long, axis and branches pilose; spikelets 1.3 to 1.5 mm long, glabrous. Autumnal phase a dense mat. 2↓ —Sandy woods, Virginia and Tennessee to Florida and Louisiana; Mexico and Cuba to Colombia (fig. 1290).

3. Angustifólia.—Densely tufted, grayish green; ligules less than 1 mm long; blades narrow, usually stiff, with prominent nerves, sometimes longitudinally wrinkled, often ciliate at base; spikelets attenuate at base, rather strongly 7-nerved, papillose-pubescent; first glume narrow and

FIGURE 1283.—Distribution of *Panicum laxiflorum.*

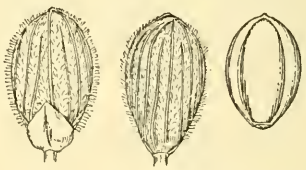

FIGURE 1284.—*Panicum xalapense.* Two views of spikelet, and floret, × 10. (Type.)

sheathing at base. Autumnal culms repeatedly branching, forming bushy crowns; blades greatly reduced.

14. Panicum aciculáre Desv. (Fig. 1291.) Vernal culms ascending from a spreading base, 20 to 50 cm tall, appressed-pubescent below;

lower sheaths villous; blades spreading or ascending, narrowed to an involute point, glabrous or the lower sparsely pilose, the middle culm blades 4 to 6 cm long, 2 to 5 mm wide; panicle 3 to 7 cm long, the flexuous branches spreading at maturity; spikelets 1.9 to 2 mm long, obovate. Autumnal phase bushy-branching, the culms 10 to 30 cm long, spreading, forming dense cushions, the blades involute, sharp-pointed, usually arcuate, mostly 1 to 3 cm long. ♃ —Sandy pine woods, Coastal Plain, New Jersey; Virginia to northern Florida, Oklahoma, and Texas; West Indies (fig. 1292).

15. Panicum chrysopsidifólium Nash. (Fig. 1293.) Vernal culms ascending or spreading, 30 to 45 cm tall, grayish-villous, especially

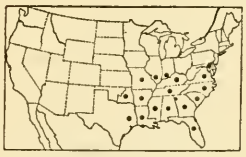

FIGURE 1285.—Distribution of *Panicum xalapense.*

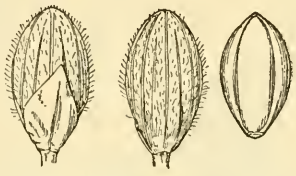

FIGURE 1286.—*Panicum ciliatum.* Two views of spikelet, and floret, × 10. (Type.)

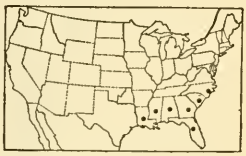

FIGURE 1287.—Distribution of *Panicum ciliatum.*

below, the nodes bearded; sheaths villous; blades 5 to 10 cm long, 3 to 5 mm wide, villous on both surfaces; panicle 4 to 6 cm long; spikelets 2 mm long, obovate, villous. Autumnal phase spreading, forming mats; blades flat, becoming papery with age. ♃ —Sandy pine woods, Coastal Plain, Florida to Arkansas and Texas; West Indies (fig. 1294).

16. Panicum consanguíneum Kunth. (Fig. 1295.) Vernal culms ascending or spreading, 20 to 50 cm tall, densely felty-villous below, the nodes bearded; sheaths villous, especially the lower; blades 7 to 11 cm long, 5 to 8 mm wide, villous, or nearly glabrous above; pan

FIGURE 1288.—*Panicum polycaulon.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1289.—*Panicum strigosum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1290.—Distribution of *Panicum strigosum.*

icle 4 to 8 cm long, the lower branches narrowly ascending; spikelets 2.6 to 2.8 mm long, obovate, papillose-villous. Autumnal phase spreading or decumbent, the numerous branches somewhat flabellately fascicled, the blades 3 to 4 cm long, 2 to 3 mm wide, flat, thin, papery. ♃ —Sandy pine woods, Coastal Plain, Virginia to northern Florida, west to Arkansas and Texas (fig. 1296).

17. Panicum angustifólium Ell. (Fig. 1297.) Vernal culms erect or nearly so, 30 to 50 cm tall, the lowermost internodes gray crisp-villous; lower sheaths appressed-villous, the upper glabrous; blades stiffly ascending, 8 to 15 cm long, 4 to 8 mm wide, long-acuminate; panicle long-exserted, 4 to 10 cm long, loosely flowered, the branches widely spreading at anthesis, the lower often reflexed; spikelets 2.5 to 2.8 mm long, elliptic-obovate, papillose-villous. Autumnal phase

ascending or somewhat topheavy-reclining, not spreading or matlike; blades very numerous, flat, appressed, rather thin and papery. 2l —Sandy pine woods, Coastal Plain, New Jersey to northern Florida and Texas; Tennessee (Knoxville); Nicaragua (fig. 1298).

18. Panicum fusifórme Hitchc. (Fig. 1299.) Vernal phase as in *P. angustifolium;* culms 30 to 70 cm tall, the basal and lower blades softly pubescent beneath; spikelets 3.3 to 3.5 mm long, elliptic,

FIGURE 1291.—*Panicum aciculare.* Plant, × 1; two views of spikelet, and floret, × 10. (Vernal phase, Chase 7148, N.C.; autumnal phase, Hitchcock 317, N.C.)

acutish or beaked beyond the fruit, long-attenuate at base, papillose-villous. Autumnal phase bushy, the blades soon involute, 3 to 5 cm long. 2l —Sandy pine woods, southern Georgia to Florida and Mississippi; West Indies; British Honduras (fig. 1300).

19. Panicum arenicoloídes Ashe. (Fig. 1301.) Vernal phase intermediate between that of *P. angustifolium* and *P. aciculare;* culms 30 to 50 cm tall; lower sheaths and blades softly villous; blades

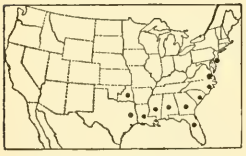

FIGURE 1292.—Distribution of *Panicum aciculare.*

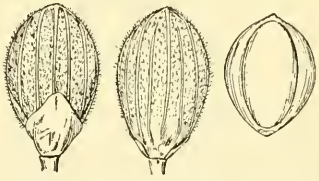

FIGURE 1293.—*Panicum chrysopsidifolium.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1294.—Distribution of *Panicum chrysopsidifolium.*

7 to 12 cm long, 3 to 4 mm wide, apex subinvolute; panicle 4 to 6 cm long, the lower branches ascending; spikelets 2.1 to 2.5 mm long, obovate, papillose-pilose. Autumnal phase bushy-branching, erect or topheavy, the blades involute. 2l —Sandy pine woods, Coastal Plain, North Carolina to Florida, Arkansas, and Texas; Cuba; Guatemala (fig. 1302).

20. Panicum ovínum Scribn. and Smith. (Fig. 1303.) Vernal culms erect or nearly so, not densely tufted, glabrous, 30 to 50 cm tall; sheaths glabrous or the lowermost appressed-pubescent; blades

erect or ascending, 10 to 15 cm long, 3 to 6 mm wide, glabrous; panicle 5 to 9 cm long, the lower branches ascending; spikelets 2.1 to 2.2 mm long, papillose-pubescent, sometimes minutely so. Autumnal phase erect or nearly so, the blades becoming loosely involute.

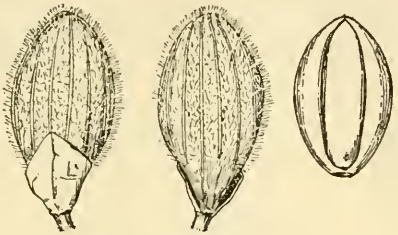

FIGURE 1295.—*Panicum consanguineum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1296.—Distribution of *Panicum consanguineum.*

2↓ —Dry or moist open ground, Mississippi to Arkansas and eastern Texas; Mexico (fig. 1304).

21. Panicum neuránthum Griseb. (Fig. 1305.) Vernal phase glabrous as a whole; culms 30 to 60 cm tall; blades erect or ascending,

FIGURE 1298.—Distribution of *Panicum angustifolium.*

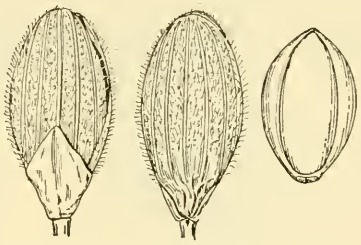

FIGURE 1297.—*Panicum angustifolium.* Two views of spikelet, and floret, × 10. (Type.)

the short basal blades few or wanting; panicle 5 to 9 cm long, narrow, the flexuous branches narrowly ascending, the branchlets appressed, the short-pediceled spikelets more or less secund along the branches;

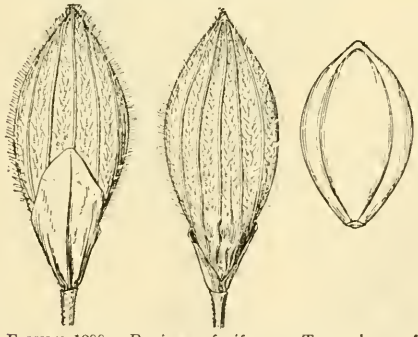

FIGURE 1299.—*Panicum fusiforme.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1300.—Distribution of *Panicum fusiforme.*

spikelets 2 mm long, finely papillose-pubescent. Autumnal culms erect, about as tall as the vernal phase; blades involute. 2↓ — Savannas and open ground, southern Florida; Mississippi (Horn Island); Cuba.

4. Bicknelliana.—In small tufts, erect or ascending; sheaths glabrous; ligules nearly obsolete; panicles few-flowered; spikelets long-pediceled, 7-nerved. Autumnal culms sparingly branching from upper or middle nodes, the blades not much reduced. Intermediate in habit between Depauperata and Dichotoma.

22. Panicum bicknéllii Nash. (Fig. 1306.) Vernal phase bluish green; culms 30 to 50 cm tall; nodes sparsely bearded or glabrous;

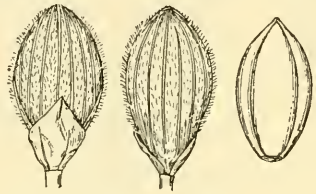

FIGURE 1301. *Panicum arenicoloides.* Two views of spikelet, and floret, × 10. (Type.)

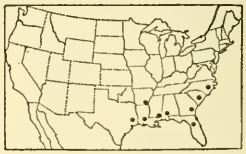

FIGURE 1302.—Distribution of *Panicum arenicoloides.*

blades stiffly ascending, 8 to 15 cm long, 3 to 8 mm wide, the uppermost usually the longest, narrowed toward the usually ciliate base; panicle 5 to 8 cm long, the branches ascending; spikelets 2.3 to 2.8 mm long, sparsely pubescent or rarely glabrous. Autumnal culms erect, forming a loose bushy tuft, the stiffly ascending blades not much reduced, overtopping the narrow few-flowered panicles. 2↓ —Dry

FIGURE 1304.—Distribution of *Panicum ovinum.*

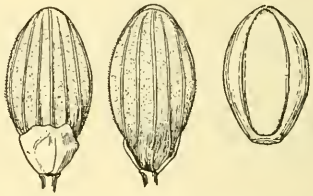

FIGURE 1303.—*Panicum ovinum.* Two views of spikelet, and floret, × 10. (Type.)

sterile or rocky woods, Connecticut and Michigan to Georgia and Missouri (fig. 1307).

23. Panicum calliphýllum Ashe. (Fig. 1308.) Vernal phase yellowish green; culms 35 to 50 cm tall; nodes sparsely villous; blades ascending, 8 to 12 cm long, 9 to 12 mm wide, ciliate at the rounded base; panicle 7 to 9 cm long, with a few ascending branches; spikelets mostly 3 mm long, elliptic, sparsely pubescent. Autumnal culms sparingly branching from the middle nodes, the branches about as long as the internodes, erect. 2↓ —Woods, rare and local, Ontario, Massachusetts, New York, Ohio.

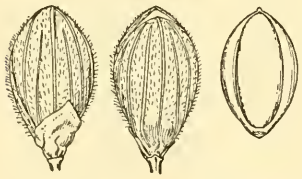

FIGURE 1305.—*Panicum neuranthum.* Two views of spikelet, and floret, × 10. (Type.)

5. Nudicaúlia.—A single rare and local species.

24. Panicum nudicaúle Vasey. (Fig. 1309.) Vernal culms erect from a somewhat spreading base, 40 to 60 cm tall, glabrous; sheaths glabrous; blades erect, rather thick, 4 to 10 cm long, 5 to 8 mm wide, the uppermost reduced, giving the culm a naked appearance; panicle long-exserted, 4 to 7 cm long, few-flowered, the branches ascending; spikelets 2.7 to 2.9 mm long, narrowly ovate, acuminate, glabrous. Autumnal phase

unknown. ♃ —Swamps, rare, western Florida, southern Alabama, and Mississippi.

6. Dichotóma.—Culms few to many in a tuft, glabrous, or only the nodes pubescent; sheaths mostly glabrous or nearly so; ligules minute; panicles open; spikelets 5- to 7-nerved. Autumnal culms usually freely branching, leaves and panicles usually much reduced.

25. Panicum microcárpon Muhl. (Fig. 1310.) Vernal culms tufted, erect or sometimes geniculate at base, 60 to 100 cm tall, the nodes densely bearded with reflexed hairs; sheaths often mottled with white spots between the nerves; blades spreading, the upper often

FIGURE 1306.—*Panicum bicknellii.* Plant, × 1; two views of spikelet, and floret, × 10. (Porter, Pa.)

FIGURE 1307.—Distribution of *Panicum bicknellii.*

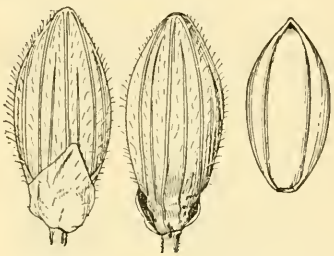

FIGURE 1308.—*Panicum calliphyllum.* Two views of spikelet, and floret, × 10. (Type.)

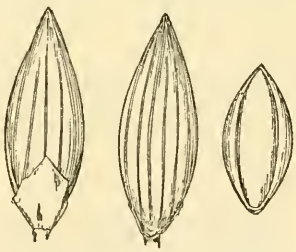

FIGURE 1309.—*Panicum nudicaule.* Two views of spikelet, and floret, × 10. (Type.)

reflexed, 10 to 12 cm long, 8 to 15 mm wide, glabrous, sparsely papillose-ciliate at base; panicle many-flowered, 8 to 12 cm long; spikelets 1.6 mm long, elliptic, glabrous (rarely minutely pubescent). Autumnal phase much branched from all the nodes, reclining from the weight of the dense mass of branches; blades flat, mostly 2 to 4 cm long. ♃ —Wet woods and swampy places, Massachusetts to Illinois, south to northern Florida and eastern Texas (fig. 1311).

26. Panicum nítidum Lam. (Fig. 1312.) Vernal culms tufted, erect, 30 to 60 cm tall, the nodes bearded with reflexed hairs; upper

sheaths often glandular-mottled; blades glabrous, 5 to 10 mm wide, the upper usually reflexed; panicle ovoid, 5 to 8 cm long, many-flowered; spikelets elliptic, 2 mm long, pubescent. Autumnal phase erect or reclining, the branchlets and foliage forming large clusters from the

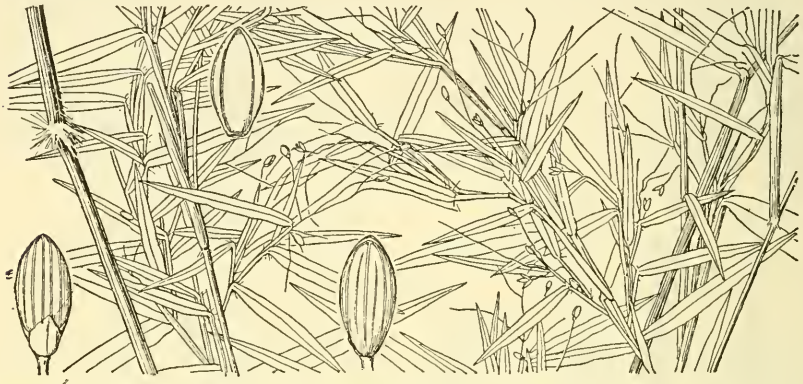

FIGURE 1310.—*Panicum microcarpon.* Plant, × 1; two views of spikelet, and floret, × 10. (Maxon and Standley 86, Md.)

nodes of the primary culms. 2↓ —Low moist or marshy ground, Coastal Plain, Virginia to Florida and Texas; Missouri (Carter County); Bahamas, Cuba (fig. 1313).

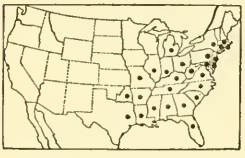

FIGURE 1311.—Distribution of *Panicum microcarpon.*

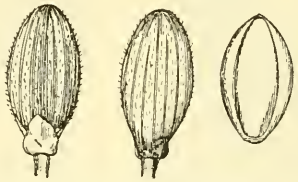

FIGURE 1312.—*Panicum nitidum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1313.—Distribution of *Panicum nitidum.*

27. Panicum ánnulum Ashe. (Fig. 1314.) Vernal phase usually purplish, in small tufts or solitary; culms 35 to 60 cm tall, the nodes densely bearded; sheaths velvety-pubescent or the upper nearly glabrous; blades densely velvety-pubescent on both surfaces; panicle 6 to

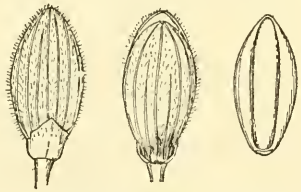

FIGURE 1314.—*Panicum annulum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1315.—Distribution of *Panicum annulum.*

8 cm long; spikelets 2 mm long, elliptic, pubescent. Autumnal phase suberect, bearing in late autumn a few short erect branches at the upper nodes. 2↓ —Dry woods, Coastal Plain, rare, Massachusetts to Florida and Mississippi; Michigan; Missouri (fig. 1315).

28. Panicum mattamuskeeténse Ashe. (Fig. 1316.) Vernal phase olivaceous, usually tinged with purple; culms erect, often 1 m tall, the nodes bearded or the upper puberulent only; sheaths velvety-pilose or the upper sometimes glabrous: blades horizontally spreading, 8 to

FIGURE 1316.—*Panicum mattamuskeetense.* Two views of spikelet, and floret, × 10. (Type coll.)

FIGURE 1317.—Distribution of *Panicum mattamuskeetense.*

12 cm long, 8 to 12 mm wide, velvety-pubescent, or the upper glabrous; panicle 8 to 10 cm long, many-flowered; spikelets about 2.5 mm long, elliptic, pubescent. Autumnal phase erect or leaning, branching rather sparingly from the middle nodes. ♃ —Low moist ground, Coastal Plain, New York to South Carolina (fig. 1317).

FIGURE 1319.—Distribution of *Panicum clutei.*

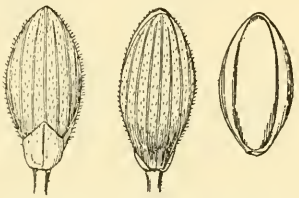

FIGURE 1318.—*Panicum clutei.* Two views of spikelet, and floret, × 10. (Type.)

29. Panicum clútei Nash. (Fig. 1318.) Similar to *P. mattamuskeetense* but less pubescent, only the lowermost nodes, sheaths, and blades velvety; spikelets 2.2 to 2.3 mm long. ♃ —Low moist ground and cranberry bogs, Massachusetts to North Carolina (fig. 1319). Intergrades with *P. mattamuskeetense.*

30. Panicum boreále Nash. (Fig. 1320.) Vernal culms usually erect, 30 to 50 cm tall, the nodes mostly glabrous; blades erect or

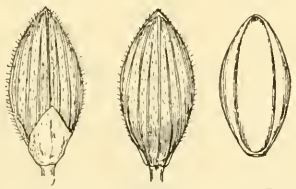

FIGURE 1320.—*Panicum boreale.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1321.—Distribution of *Panicum boreale.*

sometimes spreading, 7 to 12 mm wide, sparsely ciliate at the rounded base; panicle loosely rather few-flowered, 5 to 10 cm long; spikelets 2 to 2.2 mm long, elliptic, pubescent. Autumnal phase erect or leaning, sparingly branching from all the nodes in late summer, the branches erect, the leaves and panicles not greatly reduced. ♃ —Moist open ground or woods, Newfoundland to Minnesota, south to New Jersey and Indiana (fig. 1321).

FIGURE 1322.—*Panicum dichotomum*. Plant, × ½; two views of spikelet, and floret, × 10. (Bissell 5576, Conn.)

31. Panicum dichótomum L. (Fig. 1322.) Vernal phase often purplish; culms erect from a knotted crown, 30 to 50 cm tall, the lower nodes sometimes with a few spreading hairs; blades spreading, 4 to 8 mm wide, glabrous; panicle 4 to 9 cm long, the axis and spreading branches flexuous; spikelets 2 mm long, elliptic, glabrous (rarely pubescent); second glume shorter than the fruit at maturity. Autumnal phase much branched at the middle nodes, the lower part usually erect and devoid of blades, giving the plants the appearance of diminutive trees; blades numerous, often involute. ♃ —Dry or sterile

FIGURE 1323.—Distribution of *Panicum dichotomum.*

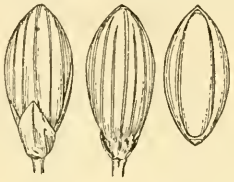

FIGURE 1324.—*Panicum barbulatum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1325.—Distribution of *Panicum barbulatum.*

woods, New Brunswick to Illinois, south to Florida and eastern Texas (fig. 1323).

32. Panicum barbulátum Michx. (Fig. 1324.) Vernal phase, resembling that of *P. dichotomum*, the culms 50 to 80 cm tall, the lower nodes usually bearded; blades slightly wider, panicle slightly larger, spikelets 2 mm long, glabrous; second glume as long as the fruit at maturity. Autumnal phase diffusely branched, forming very large topheavy reclining bunches, the slender branches recurved, the numerous flat blades horizontally spreading. ♃ —Sterile or rocky woods, Massachusetts to Michigan and Missouri, south to Georgia and eastern Texas (fig. 1325). This species seems to intergrade with

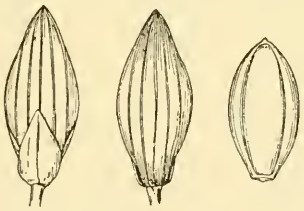

FIGURE 1326.—*Panicum yadkinense.* Two views of spikelet, and floret, × 10. (Type coll.)

FIGURE 1327.—Distribution of *Panicum yadkinense.*

P. dichotomum, but typically the autumnal phases are distinctly different. The vernal culms of *P. barbulatum* are usually more robust and the lower nodes are rather strongly bearded.

33. Panicum yadkinénse Ashe. (Fig. 1326.) Vernal phase similar to that of *P. dichotomum*, the culms sometimes 1 m tall; sheaths bearing pale glandular spots; blades longer and 8 to 11 mm wide; panicle 10 to 12 cm long; spikelets 2.3 to 2.5 mm long, elliptic to subfusiform, pointed a little beyond the fruit, glabrous. Autumnal phase erect or leaning, loosely branching from the middle nodes, the blades not conspicuously reduced. ♃ —Moist woods and thickets, Pennsylvania to Illinois, south to Georgia and Louisiana (fig. 1327). Named from Yadkin River, N.C.

34. Panicum roanokénse Ashe. (Fig. 1328.) Vernal phase somewhat glaucous olive green; culms erect or ascending, 50 to 100 cm. tall; blades at first stiffly erect, later somewhat spreading, 3 to 8 mm wide, glabrous; panicle 4 to 8 cm long; spikelets 2 mm long, turgid, elliptic, glabrous, the second glume often purple at base. Autumnal phase erect or decumbent, branching at the middle and upper nodes, the branches numerous but not in tufts, the reduced blades subinvolute. 2l —Open swampy woods or wet peaty meadows, Coastal Plain, southeastern Delaware to Florida and Texas; Jamaica (fig. 1329).

35. Panicum caeruléscens Hack. (Fig. 1330.) Vernal phase similar to that of *P. roanokense;* culms more slender; blades ascending

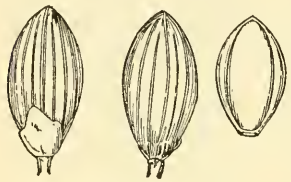

FIGURE 1328.—*Panicum roanokense.* Two views of spikelet, and floret, × 10. (Ashe, N.C.)

FIGURE 1329.—Distribution of *Panicum roanokense.*

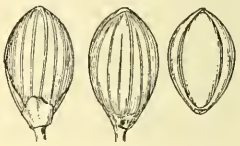

FIGURE 1330.—*Panicum caerulescens.* Two views of spikelet, and floret, × 10. (Type.)

or spreading, commonly purplish beneath; panicle 3 to 7 cm long; spikelets 1.5 to 1.6 mm long, obovoid, turgid, glabrous. Autumnal phase erect or leaning, producing short densely fascicled branches at the middle and upper nodes, these tufts scarcely as long as the primary internodes. 2l —Marshes and swampy woods, Coastal Plain, southern New Jersey to Florida and Mississippi; Cuba (fig. 1331).

36. Panicum lúcidum Ashe. (Fig. 1332.) Vernal phase at first erect and resembling that of *P. dichotomum,* but the weak culms soon decumbent; blades thin, shining, bright green, glabrous, at first erect but soon widely spreading, 4 to 6 mm wide; panicle resembling tha, of *P. dichotomum* but fewer-flowered; spikelets 2 to 2.1 mm longt

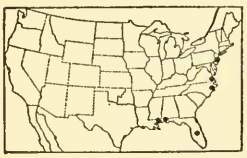

FIGURE 1331.—Distribution of *Panicum caerulescens.*

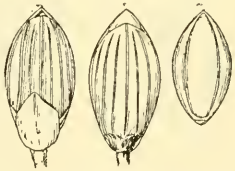

FIGURE 1332.—*Panicum lucidum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1333.—Distribution of *Panicum lucidum.*

elliptic, glabrous (rarely pubescent), the tip of the fruit exposed at maturity. Autumnal phase repeatedly branching, forming large clumps or mats of slender weak vinelike culms, the branches elongate and diverging at a wide angle, not fascicled, the blades waxy, flat, spreading. 2l —Wet woods and sphagnum swamps, Coastal Plain, Massachusetts to Florida, Arkansas, and Texas; Indiana (near Lake Michigan), Michigan (Port Huron) (fig. 1333).

37. Panicum sphagnícola Nash. (Fig. 1334.) Vernal phase grayish olive green; culms strongly flattened, erect or reclining, 50 to 100 cm tall; sheaths soon divaricate; blades glabrous, 3 to 7 mm wide; panicle narrow, 5 to 6 cm long; spikelets 2.5 mm long, elliptic, glabrous or

minutely pubescent toward the summit. Autumnal phase decumbent or finally prostrate-spreading, divaricately branching from all the nodes, the branches slender, elongate. 2↓ —Edges of cypress swamps, in sphagnum bogs, and in similar moist shady places, southern Georgia and Florida.

7. Spréta.—Culms tufted, rather stiff, mostly glabrous or nearly so; ligules densely hairy, 2 to 5 mm long; blades mostly firm; spikelets 5- to 7-nerved, mostly pubescent. Autumnal culms with rather short-tufted branchlets and greatly reduced leaves and panicles.

38. Panicum sprétum Schult. (Fig. 1335.) Vernal culms 30 to 90

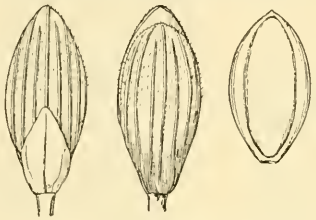

FIGURE 1334.—*Panicum sphagnicola.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1335.—*Panicum spretum.* Two views of spikelet, and floret, × 10. (Type.)

cm tall, erect; sheaths glabrous; ligule 2 to 3 mm long; blades firm, ascending to reflexed, 4 to 8 mm wide, sparingly ciliate around the base; panicle 8 to 12 cm long, the branches ascending or appressed; spikelets about 1.5 mm long, elliptic, rarely glabrous. Autumnal phase mostly reclining, the early branches elongate, the subsequent branches in short fascicles. 2↓ —Wet usually sandy soil, Coastal Plain, Nova Scotia to Texas; Indiana (fig. 1336).

Figure 1336.—Distribution of *Panicum spretum.*

39. Panicum lindheiméri Nash. (Fig. 1337.) Vernal culms ascending or spreading, 30 to 100 cm tall, the lower internodes and sheaths sometimes ascending-pubescent; ligule 4 to 5 mm long; blades 6 to 8 mm wide, glabrous; panicle 4 to 7 cm long, about as wide; spikelets 1.4 to 1.6 mm long, obovate. Autumnal phase usually stiffly spreading or radiate-prostrate, with elongate internodes and tufts of short appressed branches; blades involute-pointed, often conspicuously ciliate at base. 2↓ —Dry sandy or sterile woods or open ground, Quebec and Maine to Minnesota, south to northern Florida and New Mexico; California (fig. 1338).

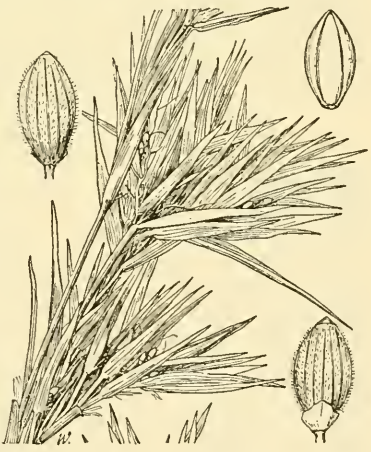

FIGURE 1337.—*Panicum lindheimeri.* Plant, × 1; two views of spikelet, and floret, × 10. (Chase 4449, Miss.)

40. Panicum leucóthrix Nash. (Fig. 1339.) Vernal phase light olive green; culms 25 to 45 cm tall, erect or ascending, appressed papillose-pilose, the nodes pubescent; sheaths papillose-pilose; ligule 3 mm long; blades 3 to 7 mm wide, glabrous or sparsely villous on the upper

surface, velvety-puberulent beneath; panicle 3 to 8 cm long, rather densely flowered; spikelets 1.2 to 1.3 mm long, densely papillose-pubescent. Autumnal culms at first sending out from lower and middle nodes long branches similar to primary culms, later producing more or less fascicled branches. 2l —Low pinelands, Coastal Plain, New Jersey to Florida and Louisiana; West Indies (fig. 1340).

41. Panicum longiligulátum Nash. (Fig. 1341.) Vernal culms 30 to 70 cm tall; sheaths glabrous; ligule 2 to 3 mm long; blades 4 to 8 mm wide, glabrous on the upper surface, puberulent beneath; panicle 3 to 8 cm long, the slender branches stiffly ascending; spikelets 1.1 to 1.2 mm long. Autumnal culms reclining, the branches spreading,

FIGURE 1338.—Distribution of *Panicum lindheimeri.*

FIGURE 1339.—*Panicum leucothrix.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1340.—Distribution of *Panicum leucothrix.*

the branchlets crowded, the blades subinvolute. 2l —Low pine barrens and swamps, Coastal Plain, Pennsylvania (Bucks County), southeastern Virginia to Florida and Texas; Tennessee; Central America (fig. 1342).

42. Panicum wrightiánum Scribn. (Fig. 1343.) Vernal culms weak, slender, ascending from a decumbent base, 15 to 40 cm tall, minutely puberulent; sheaths glabrous or puberulent; ligule 2 to 3 mm long; blades 2 to 4 cm long, 3 to 5 mm wide, glabrous or puberulent beneath and minutely pilose above; panicle 3 to 6 cm long; spikelets 1 mm long. Autumnal culms decumbent-spreading, sending out from lower and middle nodes numerous ascending branches, becoming

FIGURE 1341.—*Panicum longiligulatum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1342.—Distribution of *Panicum longiligulatum.*

FIGURE 1343.—*Panicum wrightianum.* Two views of spikelet, and floret, × 10. (Type.)

bushy-branched, the flat or subinvolute blades and secondary panicles not greatly reduced. 2l —Margins of streams and ponds in sandy or mucky soil, Coastal Plain, Massachusetts to Florida and Mississippi; Cuba and Central America (fig. 1344).

8. Lanuginósa.—Mostly pubescent throughout; ligules densely hairy, 2 to 5 mm long; spikelets 5- to 9-nerved, pubescent. Autumnal culms usually freely branching, the leaves and panicles mostly greatly reduced.

43. Panicum meridionále Ashe. (Fig. 1345.) Vernal culms 15 to 40 cm tall, the lower internodes and sheaths pilose, the upper minutely appressed-pubescent; ligule 3 to 4 mm long; blades 1.5 to 4 cm long, 2 to 4 mm wide, long-pilose on the upper surface, the hairs erect; panicle 1.5 to 4 cm long, the axis appressed-pubescent to

glabrous; spikelets 1.3 to 1.4 mm long. Autumnal culms erect, with fascicled branchlets from all the nodes; leaves and panicles not greatly reduced. 2l —Sandy or sterile woods and clearings, Nova Scotia to Wisconsin, south to Alabama (fig. 1346).

44. Panicum albemarlénse Ashe. (Fig. 1347.) Vernal phase olivaceous, grayish-villous throughout; culms 25 to 45 cm tall, at first erect, soon geniculate and spreading; blades 3 to 6 mm wide, the upper surface puberulent as well as long-villous; panicle 3 to 5 cm long, the axis puberulent; spikelets 1.4 mm long, pilose. Autumnal culms widely decumbent, spreading or ascending, freely branching at all but the uppermost nodes, the branches narrowly ascend-

FIGURE 1344.—Distribution of *Panicum wrightianum.*

FIGURE 1345.—*Panicum meridionale.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1346.—Distribution of *Panicum meridionale.*

ing. 2l —Low sandy woods or open ground, Coastal Plain, Massachusetts to North Carolina; Indiana to Wisconsin; Tennessee (fig. 1348).

45. Panicum implicátum Scribn. (Fig. 1349.) Vernal culms slender, 20 to 55 cm tall, erect or ascending, papillose-pilose with spreading hairs; sheaths papillose-pilose; ligule 4 to 5 mm long; blades more or less involute-acuminate, the upper surface pilose with erect hairs 3 to 4 mm long, appressed-pubescent beneath; panicle 3 to 6 cm long, the axis long-pilose, the branches flexuous, in typical specimens tangled or implicate; spikelets 1.5 mm long, papillose-pilose. Autum-

FIGURE 1347.—*Panicum albemarlense.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1348.—Distribution of *Panicum albemarlense.*

FIGURE 1349.—*Panicum implicatum.* Two views of spikelet, and floret, × 10. (Type.)

nal culms erect or spreading, loosely branching from the lower and middle nodes. 2l —Wet meadows, bogs, and sandy soil, cedar and hemlock swamps, Newfoundland to Wisconsin, south to Delaware and Missouri (fig. 1350).

46. Panicum huachúcae Ashe. (Fig. 1351.) Vernal phase light olivaceous, often purplish, harsh to the touch from copious spreading papillose pubescence; culms usually stiffly upright, 20 to 60 cm tall, the nodes bearded with spreading hairs; ligule 3 to 4 mm long; blades firm, stiffly erect or ascending, 4 to 8 cm long, 6 to 8 mm wide, the upper surface copiously short-pilose, the lower densely pubescent; panicle 4 to 6 cm long, the axis and often the branches pilose; spikelets 1.6 to 1.8 mm long, obovate, papillose-pubescent. Autumnal culms stiffly erect or ascending, the branches fascicled, the crowded blades ascending, 2 to 3 cm long, much exceeding the panicles. 2l—

Prairies and open ground, Nova Scotia to Montana, south to North Carolina and Texas, westward here and there to southern California (fig. 1352).

PANICUM HUACHUCAE var. FASCICULÁTUM (Torr.) F. T. Hubb. Vernal culms taller, more slender, less pubescent, the culms 30 to 75 cm tall; blades thin, lax, spreading, 5 to 10 cm long, 6 to 12 mm wide,

FIGURE 1350.—Distribution of *Panicum implicatum.*

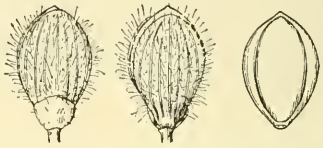

FIGURE 1351.—*Panicum huachucae.* Two views of spikelet, and floret, × 10. (Type.)

the upper surface sparsely short-pilose or with copious long hairs toward the base, the lower surface pubescent and with a satiny luster. Autumnal culms more or less decumbent with numerous fascicled branches. 2↓ (*P. huachucae* var. *silvicola* Hitchc. and Chase.)—Open woods and clearings, Quebec to Minnesota and Nebraska, south to northern Florida and Texas; Arizona (Tucson).

Panicum huachucae, *P. huachucae* var. *fasciculatum*, *P. tennesseense*, and *P. pacificum* intergrade more or less. The descriptions apply to

FIGURE 1352.—Distribution of *Panicum huachucae.*

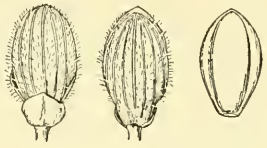

FIGURE 1353.—*Panicum tennesseense.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1354.—Distribution of *Panicum tennesseense.*

the great bulk of specimens but the distinctions fail to hold for occasional specimens.

47. Panicum tennesseénse Ashe. (Fig. 1353.) Vernal phase bluish green; culms suberect or stiffly spreading, 25 to 60 cm tall, papillose-pilose or the upper portion glabrous; ligule dense, 4 to 5 mm long; blades firm, with a thin white cartilaginous margin, 5 to 8 mm wide, the upper surface glabrous or with a few long hairs toward the base, the lower surface appressed-pubescent or nearly glabrous; panicle 4 to 7 cm long; spikelets 1.6 to 1.7 mm long. Autumnal culms widely spreading or decumbent, with numerous fascicled somewhat flabellate branches, often forming prostrate mats; blades usually ciliate at base. 2↓ —Open rather moist ground and borders of woods, Quebec to Minnesota, south to Georgia and Texas, and also at a few points west to Utah and Arizona (fig. 1354).

48. Panicum lanuginósum Ell. (Fig. 1355.) Vernal phase grayish olive-green, velvety-villous throughout; culms usually in large clumps, 40 to 70 cm tall, lax, spreading, often with a glabrous ring below the villous nodes; ligule 3 to 4 mm long; blades thickish but not stiff, somewhat incurved or spoon-shaped (when fresh), 5 to 10 cm long, 5 to 10 mm wide; panicle 6 to 12 cm long, the axis pubescent; spikelets 1.8 to 1.9 mm long. Autumnal culms widely spreading or

decumbent, freely branching from the middle nodes, the branches repeatedly branching and much exceeding the internodes, the ultimate branchlets forming flabellate fascicles. 2↓ —Moist sandy woods, Coastal Plain, New Jersey to Florida and Texas (fig. 1356). The plants have much the aspect and pubescence of *P. scoparium* but are smaller and more slender.

49. Panicum aubúrne Ashe. (Fig. 1357.) Vernal phase grayish velvety-villous throughout; culms 20 to 50 cm tall, geniculate, widely

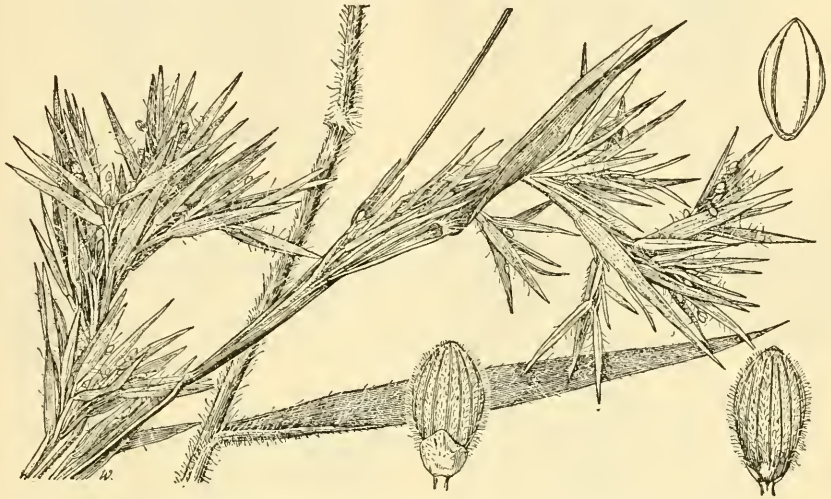

FIGURE 1355.—*Panicum lanuginosum.* Plant, × 1; two views of spikelet, and floret, × 10. (Hitchcock, N. C.)

spreading, soon becoming branched and decumbent; ligule 3 to 4 mm long; blades 3 to 7 cm long, 3 to 5 mm wide; panicle 3 to 5 cm long, the axis velvety; spikelets 1.3 to 1.4 mm long. Autumnal culms early becoming diffusely branched at all the nodes, prostrate-spreading, forming large mats, the branches curved upward at the ends. 2↓ —Sandy pine and oak woods, Coastal Plain, Massachusetts to northern Florida and Louisiana; Arkansas; Indiana, near Lake Michigan (fig. 1358).

FIGURE 1356.—Distribution of *Panicum lanugionsum.*

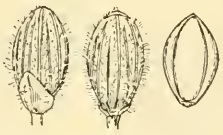

FIGURE 1357.—*Panicum aubúrne.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1358.—Distribution of *Panicum aubúrne.*

50. Panicum thurówii Scribn. and Smith. (Fig. 1359.) Vernal phase bluish green but drying olive; culms 35 to 70 cm tall, erect or ascending, villous, the nodes bearded, usually with a glabrous ring below; sheaths sparsely to densely villous; ligule 4 mm long; blades rather stiff, 6 to 10 mm wide, the upper surface sparingly pilose toward the base and margins, otherwise glabrous, the lower surface velvety-villous; panicle 7 to 11 cm long; spikelets 2 mm long. Au-

tumnal culms erect, bearing at the middle nodes a few appressed fascicles of branches. 2l —Prairies and dry open woods, Alabama (Mobile) to Texas and Arkansas (fig. 1360).

51. Panicum praecócius Hitchc. and Chase. (Fig. 1361.) Vernal culms 15 to 25 cm tall, at first erect and simple, soon branching and geniculate, becoming 30 to 45 cm long, papillose-pilose with weak

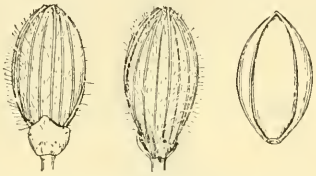

FIGURE 1359.—*Panicum thurowii.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1360.—Distribution of *Panicum thurowii.*

spreading hairs 3 to 4 mm long; sheaths pilose; ligule 3 to 4 mm long; blades 5 to 9 cm long, 4 to 6 mm wide, long-pilose on both surfaces, the hairs on the upper surface 4 to 5 mm long, erect; panicle 4 to 6 cm long, the axis pilose; spikelets 1.8 to 1.9 mm long, pilose. Autumnal culms in close bunches, 10 to 20 cm tall, the branches appressed, the scarcely reduced blades erect. 2l —Dry prairies and clearings,

FIGURE 1362.—Distribution of *Panicum praecocius.*

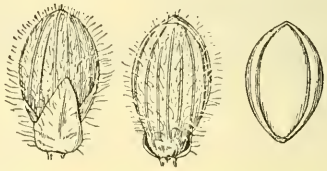

FIGURE 1361.—*Panicum praecocius.* Two views of spikelet, and floret, × 10. (Type.)

Michigan to Minnesota, south to Missouri and eastern Texas (fig. 1362).

52. Panicum subvillósum Ashe. (Fig. 1363.) Vernal culms leafy below, 10 to 45 cm tall, ascending or spreading, pilose, the nodes short-bearded; sheaths sparsely pilose with ascending hairs; ligule 3 mm long; blades 4 to 6 cm long, 4 to 6 mm wide, both surfaces

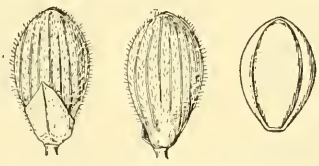

FIGURE 1363.—*Panicum subvillosum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1364.—Distribution of *Panicum subvillosum.*

pilose, the hairs on the upper surface 3 to 5 mm long; panicle long-exserted, 3 to 5 cm long; spikelets 1.8 to 1.9 mm long. Autumnal culms widely spreading or prostrate, sparingly branching from the lower nodes, the leaves and panicles not greatly reduced. 2l —Dry woods and sandy ground, Nova Scotia to Minnesota, south to New York, Indiana, and Missouri (fig. 1364).

53. Panicum occidentâle Scribn. (Fig. 1365.) Vernal culms yellowish green, leafy toward base, 15 to 40 cm tall, spreading, sparsely pubescent; sheaths sparsely pubescent; ligule 3 to 4 mm long; blades firm, erect, or ascending, 4 to 8 cm long, 5 to 7 mm wide, the upper surface nearly glabrous, the under appressed-pubescent; panicle 4 to 7 cm long; spikelets 1.8 mm long. Autumnal culms branching from

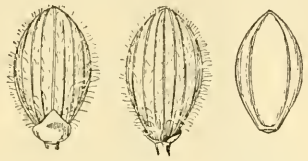

FIGURE 1365.—*Panicum occidentale.* Two views of spikelet, and floret, × 10. (Type.)

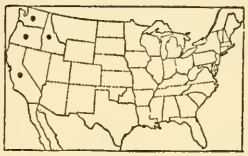

FIGURE 1366.—Distribution of *Panicum occidentale.*

the lower nodes forming a spreading tussock 10 to 15 cm high; leaves and panicles reduced. ♃ —Peat bogs and moist sandy ground, British Columbia and Idaho to southern California (fig. 1366).

54. Panicum pacíficum Hitchc. and Chase. (Fig. 1367.) Vernal phase light green; culms 25 to 50 cm tall, ascending or spreading, leafy, pilose, the nodes short-bearded; sheaths pilose; ligule 3 to 4 mm

FIGURE 1368.—Distribution of *Panicum pacificum.*

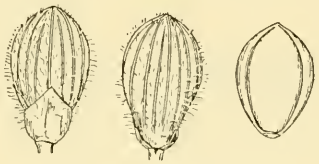

FIGURE 1367.—*Panicum pacificum.* Two views of spikelet, and floret, × 10. (Type.)

long; blades erect or ascending, 5 to 10 cm long, 5 to 8 mm wide, the upper surface pilose, the lower surface appressed-pubescent; panicle 5 to 10 cm long; spikelets 1.8 to 2 mm long. Autumnal culms prostrate spreading, repeatedly branching from the middle and upper nodes. ♃ —Sandy shores and slopes, and moist crevices of rocks,

FIGURE 1369.—*Panicum thermale.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1370.—Distribution of *Panicum thermale.*

ascending to 1,600 m, British Columbia and Idaho to Arizona and southern California (fig. 1368).

55. Panicum thermâle Boland. (Fig. 1369.) Vernal phase grayish green, densely tufted, velvety-villous; culms 10 to 30 cm tall, ascending or spreading, the nodes with a dense ring of short hairs; ligule 3 mm long; blades thick, 3 to 8 cm long, 5 to 12 mm wide; panicle 3 to 6 cm long, the axis villous; spikelets 1.9 to 2 mm long, pilose. Autumnal culms widely spreading, repeatedly branching, the whole forming a

dense cushion. 2l —Wet saline soil in the immediate vicinity of geysers and hot springs, ascending to 2,500 m, Alberta to Washington, south to Wyoming and California (fig. 1370).

56. Panicum lánguidum Hitchc. and Chase. (Fig. 1371.) Vernal culms 25 to 40 cm tall, weak, slender, ascending or spreading, pilose; sheaths pilose; ligule 3 mm long; blades thin, lax, ascending or spreading, 4 to 7 cm long, 4 to 9 mm wide, sparsely pilose on the upper surface, minutely appressed-pubescent beneath; panicle 3 to 6 cm long, the axis and branches sparsely long-pilose; spikelets 2 mm long, pilose. Autumnal culms decumbent, branching from all the nodes, forming a

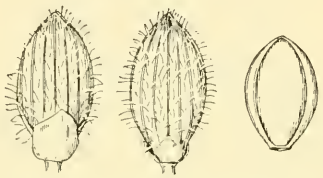

FIGURE 1371.—*Panicum languidum.* Two views of spikelet, and floret, × 10. (Type.)

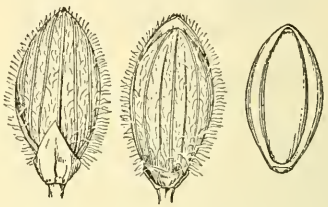

FIGURE 1372.—*Panicum villosissimum.* Two views of spikelet, and floret, × 10. (Type.)

large loose straggling clump, the ultimate blades and panicles scarcely reduced. 2l —Dry or sandy open woods, Maine, Massachusetts, Vermont, and eastern New York, apparently rare.

57. Panicum villosíssimum Nash. (Fig. 1372.) Vernal phase light olive green; culms 25 to 45 cm tall, erect or ascending, pilose with spreading hairs 3 mm long; sheaths pilose; ligule 4 to 5 mm long; blades rather firm, 6 to 10 cm long, 5 to 10 mm wide, pilose on both surfaces; panicle 4 to 8 cm long, the branches stiffly ascending or spreading; spikelets 2.2 to 2.3 mm long, pilose. Autumnal culms finally prostrate, the leaves of the fascicled branches appressed, giving the cluster or mat a combed-out appearance. 2l —Dry sandy or

FIGURE 1373.—Distribution of *Panicum villosissimum.*

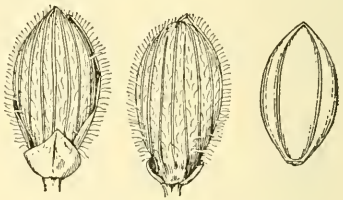

FIGURE 1374.—*Panicum pseudopubescens.* Two views of spikelet, and floret, × 10. (Type.)

sterile soil, open woods, and hillsides, Massachusetts to Minnesota, south to Florida and Texas; Guatemala (fig. 1373).

58. Panicum pseudopubéscens Nash. (Fig. 1374.) Vernal phase similar to that of *P. villosissimum;* ligule 2 to 3 mm long; blades with the pubescence on the upper surface short, sparse or wanting down the center, occasionally glabrous; spikelets 2.2 to 2.4 mm long, pilose. Autumnal culms stiffly spreading, sometimes prostrate, sparingly branching from the middle and lower nodes. 2l —Sandy open woods, Connecticut to Wisconsin, south to Florida, Kansas, and Mississippi; Mexico (fig. 1375).

59. Panicum ovále Ell. (Fig. 1376.) Vernal culms 20 to 50 cm tall, erect or ascending, rather stout, long-pilose below with ascending or appressed hairs, often nearly glabrous above, the nodes bearded; sheaths ascending-pilose; ligule 2 to 3 mm long, rather sparse; blades 5 to 10 mm wide, the upper surface nearly glabrous except for long hairs near the base and margins, the lower surface appressed-pubescent; panicle 5 to 9 cm long; spikelets, 2.7 to 2.9 mm long. Autumnal phase spreading-decumbent, the stiff culms rather loosely

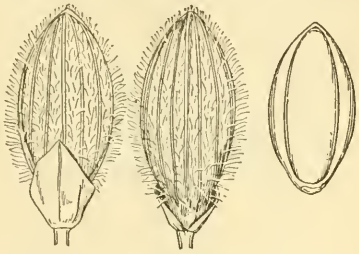

FIGURE 1376.—*Panicum ovale.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1375.—Distribution of *Panicum pseudopubescens.*

branching from the middle and upper nodes. ♃ —Dry sandy woods, Coastal Plain, North Carolina to Florida; Kansas (Saline County), Texas (Waller County) (fig. 1377).

60. Panicum scoparioídes Ashe. (Fig. 1378.) Vernal phase light green; culms 30 to 50 cm tall, erect or ascending, pilose with ascending hairs or nearly glabrous; sheaths pilose to nearly glabrous; ligule 2 to 3 mm long; blades 6 to 10 mm wide, sparsely hispid on the upper surface, appressed-pubescent beneath; panicle 4 to 7 cm long; spikelets 2.2 to 2.3 mm long, pubescent. Autumnal culms erect or spreading, sparingly branching from the upper and middle nodes. ♃ —Dry

FIGURE 1377.—Distribution of *Panicum ovale.*

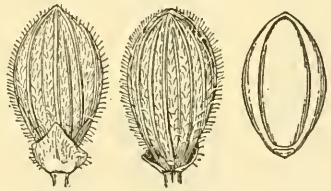

FIGURE 1378.—*Panicum scoparioides.* Two views of spikelet, and floret, × 10. (Type.)

sandy or gravelly soil, Vermont to Delaware; Michigan to Minnesota and Iowa (fig. 1379).

61. Panicum shastense Scribn. and Merr. (Fig. 1380.) Vernal culms 30 to 50 cm tall, pilose with ascending hairs, the nodes short-bearded; sheaths papillose-pilose, the hairs spreading; ligule sparse, 2 to 3 mm long; blades 6 to 8 mm wide, sparsely pilose on the upper surface, pilose beneath; panicle 6 to 8 cm long; spikelets 2.4 to 2.6 mm long. Autumnal culms spreading, with geniculate nodes and elongate arched internodes, rather sparingly branched from the middle nodes. ♃ —Moist meadows. Known only from Castle Crag, Shasta County, Calif.

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9. Columbiána.—Culms and sheaths appressed-pubescent to crisp-puberulent, the culms stiff; ligules mostly less than 1 mm long (sometimes to 1.5 mm in *P. tsugetorum* and *P. oricola*); blades firm, thick, stiffly ascending; spikelets 5- to 9-nerved, pubescent, the first glume mostly one-third to half as long as the spikelet. Autumnal culms freely branching, the branches and stiff blades mostly appressed.

62. Panicum málacon Nash. (Fig. 1381.) Vernal culms erect to stiffly spreading, purplish olive-green; culms and sheaths appressed-

FIGURE 1379.—Distribution of *Panicum scoparioides.*

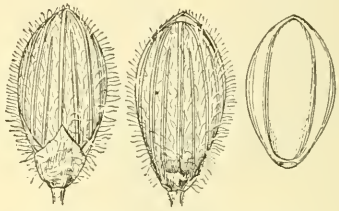

FIGURE 1380.—*Panicum shastense.* Two views of spikelet, and floret, × 10. (Type.)

pubescent, the culms 30 to 50 cm tall; blades 3 to 5 mm wide, sharply acuminate, puberulent beneath, puberulent to glabrous above; panicle 4 to 7 cm long, the branches few, stiffly ascending, the pedicels long and stiff; spikelets 3 to 3.2 mm long, obovate, the first glume distant, about half as long as the spikelet. Autumnal culms subdecumbent-spreading, branching from the lower and middle nodes, the branches appressed. 2↓ —Dry pine woods, high pineland, North Carolina (Wilmington); Florida.

63. Panicum deámii Hitchc. and Chase. (Fig. 1382.) Vernal phase yellowish green; culms 25 to 35 cm tall, erect or ascending,

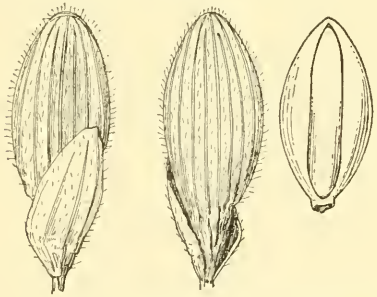

FIGURE 1381.—*Panicum malacon.* Two views of spikelet, and floret, × 10. (Type.)

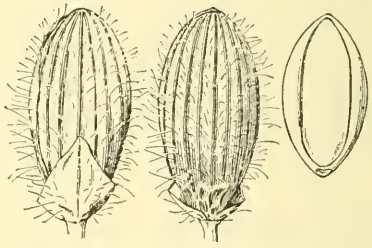

FIGURE 1382.—*Panicum deamii.* Two views of spikelet, and floret, × 10. (Type.)

papillose-pilose; sheaths papillose-villous, densely so at base and summit; blades suberect, 8 to 15 cm long, 4 to 6 mm wide, sparsely villous on the upper surface, appressed-pilose beneath; panicle rather short-exserted, 6 to 10 cm long, the branches ascending; spikelets 2.8 to 2.9 mm long, pilose. Autumnal culms branching from the middle and upper nodes, forming a somewhat bushy summit, the culms sprawling. 2↓ —Sand dunes, northern Indiana; Iowa.

64. Panicum commonsiánum Ashe. (Fig. 1383.) Vernal phase greenish olive, drying brownish; culms and sheaths appressed-pilose,

the culms 20 to 50 cm tall, ascending or spreading, appressed-pilose; blades 4 to 7 mm wide, broadest near the rounded base, glabrous or nearly so on the upper surface, strigose or glabrous beneath; panicle 4 to 8 cm long, the branches stiffly spreading; spikelets 2.2 to 2.4 mm long. Autumnal culms branching from the middle and upper nodes, finally spreading or prostrate in mats. 2↓ —Dunes and sandy woods near the coast, Massachusetts to northern Florida (fig. 1384).

65. Panicum addisóni Nash. (Fig. 1385.) Vernal phase similar to that of *P. commonsianum;* culms usually less than 40 cm tall, appressed-pilose below, puberulent above; sheaths sparsely ascending-

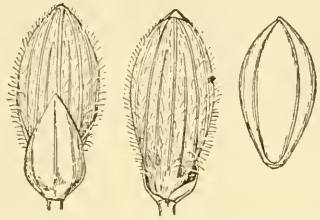

FIGURE 1383.—*Panicum commonsianum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1384.—Distribution of *Panicum commonsianum.*

pilose, blades 3 to 6 mm wide, glabrous on the upper surface, pubescent or glabrous beneath; panicle 2 to 6 cm long, more densely flowered than in *P. commonsianum;* spikelets about 2 mm long. Autumnal culms more or less spreading, rather freely branching from all the nodes, the branches appressed. 2↓ —Sand barrens, Coastal Plain, Massachusetts to South Carolina; Indiana (fig. 1386). Closely approaching *P. commonsianum* but having smaller spikelets.

66. Panicum wilmingtonénse Ashe. (Fig. 1387.) Vernal phase bluish green, culms solitary or in small tufts, slender, erect from an ascending base, 20 to 40 cm tall, pilose with soft ascending hairs;

FIGURE 1386.—Distribution of *Panicum addisoni.*

FIGURE 1385.—*Panicum addisoni.* Two views of spikelet, and floret, × 10. (Type.)

sheaths pubescent like the culms, densely villous-ciliate at the summit; blades 3 to 7 mm long, glabrous on the upper surface, softly pubescent or nearly glabrous beneath, strongly ciliate near the base, the thick cartilaginous margin white when dry; panicle 5 to 8 cm long; spikelets 2 mm long. Autumnal culms spreading, branching from the middle and upper nodes. 2↓ —Sandy woods, North Carolina, South Carolina, and Alabama, rare.

67. Panicum tsugetórum Nash. (Fig. 1388.) Vernal phase usually pale bluish green; culms 30 to 50 cm tall, spreading or ascending, the lower nodes often geniculate, densely appressed-pubescent with short crisp hairs, long hairs more or less intermixed; sheaths

pubescent like the culm; ligule 1 to 1.5 mm long; blades 4 to 7 mm wide, glabrous or nearly so on the upper surface, appressed-pubescent beneath; panicle 3 to 7 cm long; spikelets 1.8 to 1.9 mm long. Autumnal culms decumbent-spreading, branching from the lower and middle nodes. 2↓ —Sandy woods, Maine to Wisconsin, south to Georgia and Tennessee (fig. 1389).

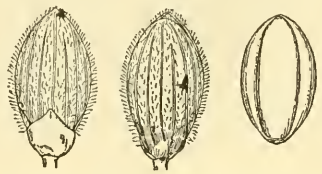

FIGURE 1387.—*Panicum wilmingtonense.* Two views of spikelet, and floret, × 10. (Type.)

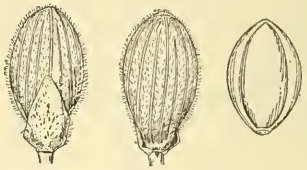

FIGURE 1388.—*Panicum tsugetorum.* Two views of spikelet, and floret, × 10. (Type.)

68. Panicum columbiánum Scribn. (Fig. 1390.) Vernal culms 15 to 50 cm tall, ascending, densely crisp-puberulent; sheaths less pubescent than the culms; blades 3 to 6 cm long, 3 to 5 mm wide, usually glabrous on the upper surface, appressed-puberulent or glabrous beneath; panicle 2 to 4 cm long; spikelets 1.5 to 1.6 mm long. Autumnal culms branching from the middle and upper nodes, becoming widely spreading or decumbent at base. 2↓ —Sandy woods and open ground, Maine to North Carolina; Indiana (fig. 1391).

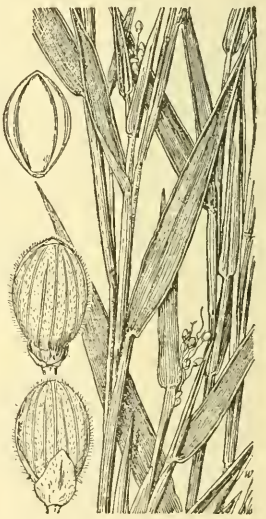

FIGURE 1390.—*Panicum columbianum.* Plant, × 1; two views of spikelet, and floret, × 10. (Type.)

PANICUM COLUMBIANUM var. THÍNIUM Hitchc. and Chase. Vernal culms more slender, usually about 20 cm tall; blades rarely more than 3 cm long, sparsely pilose with long hairs on the upper surface; panicle 1.5 to 4 cm long; spikelets 1.3 to 1.4 mm long. Autumnal culms with branches more crowded and aggregate toward the summit. 2↓ —Dry sand, Massachusetts to Virginia.

FIGURE 1389.—Distribution of *Panicum tsugetorum.*

69. Panicum orícola Hitchc. and Chase. (Fig. 1392.) Vernal phase grayish, often purplish; culms and sheaths appressed-pilose, the culms 10 to 30 cm tall, spreading; ligule 1 to 1.5 mm long; blades 2 to 5 cm long, 2 to 4 mm wide, the upper surface pilose with hairs 3 to 5 mm long, the lower surface appressed-pilose; panicle short-exserted, ovoid, 1.8 to 3 cm long, rather densely flowered; spikelets 1.5 mm long, broadly obovate, turgid. Autumnal culms prostrate, forming mats, with short fascicled branches at all the nodes. 2↓ — Sand barrens along the coast, Massachusetts to Virginia (fig. 1393).

10. **Sphaerocárpa.** Glabrous as a whole; culms few in a tuft, relatively stout; ligules obsolete or nearly so; blades mostly thick, firm, cartilaginous-margined, cordate and ciliate at base, panicle branches mostly viscid; spikelets obovoid-spherical at maturity, oval when young, 5- to 7-nerved, puberulent. Autumnal culms remaining simple or only sparingly branching, the thick white-margined blades of the winter rosette conspicuous.

70. Panicum sphaerocárpon Ell. (Fig. 1394.) Vernal phase light green; culms 20 to 55 cm tall, radiate-spreading, sometimes nearly

FIGURE 1391.—Distribution of *Panicum columbianum.*

FIGURE 1392.—*Panicum oricola.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1393.—Distribution of *Panicum oricola.*

erect, the nodes appressed-pubescent; blades 7 to 14 mm wide; panicle 5 to 10 cm long, about as wide; spikelets 1.6 to 1.8 mm long. Autumnal phase prostrate-spreading, sparingly branched late in the season from the lower and middle nodes, the branches short, mostly simple. 2l —Sandy soil, Vermont to Kansas, south to northern Florida and Texas; Mexico to Venezuela (fig. 1395). PANICUM SPHAEROCARPON var. INFLÁTUM (Scribn. and Smith) Hitchc. and Chase. Differing from *P. sphaerocarpon* in having a ligule as

FIGURE 1394.—*Panicum sphaerocarpon.* Plant, × 1; two views of spikelet, and floret, × 10. (Deam, Ind.)

FIGURE 1395.—Distribution of *Panicum sphaerocarpon.*

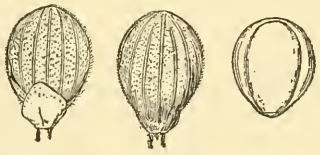

FIGURE 1396.—*Panicum polyanthes.* Two views of spikelet, and floret, × 10. (Type.)

much as 1 mm long, spikelets 1.4 to 1.5 mm long, and more freely branching autumnal culms; many intergrades occur. 2l —Moist sandy soil, Coastal Plain, Delaware to Florida and Texas, north to Oklahoma and Missouri.

71. Panicum polyánthes Schult. (Fig. 1396.) Vernal culms erect, 30 to 90 cm tall, the nodes glabrous or nearly so; blades 12 to 23 cm long, 15 to 25 mm wide, the upper scarcely reduced; panicle 8 to 25

cm long, one-fourth to half as wide, densely flowered; spikelets 1.5 to 1.6 mm long, minutely puberulent. Autumnal phase remaining erect, producing simple branches from the lower and middle nodes. 2l —Damp ground, woods, and openings, Connecticut to Oklahoma, south to Georgia and Texas (fig. 1397).

72. Panicum erectifólium Nash. (Fig. 1398.) Vernal culms 30 to 70 cm tall, erect or ascending; sheaths usually crowded at base; ligule very short; blades 7 to 13 cm long, 6 to 12 mm wide, the crowded lower ones usually much larger than the others; panicle 6 to 12 cm long, rather narrow, densely flowered, spikelets 1 to 1.2 mm long, nearly spherical, densely puberulent. Autumnal culms remaining

FIGURE 1397.—Distribution of *Panicum polyanthes.*

FIGURE 1398.—*Panicum erectifolium.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1399.—Distribution of *Panicum erectifolium.*

erect, late in the season producing branches from the third or fourth node, the branches nearly as long as the primary culms. 2l — Moist pine barrens, swamps, and borders of ponds, North Carolina to Florida and Louisiana; Cuba (fig. 1399).

11. Ensifólia. Low and slender, mostly glabrous throughout (except in *P. curtifolium* and *P. tenue*); ligules nearly obsolete; spikelets 5- to 7-nerved. Autumnal culms simple to freely branching.

73. Panicum ténue Muhl. (Fig. 1400.) Vernal phase olive green; culms 20 to 55 cm tall, sometimes sparsely appressed-pubescent below; sheaths puberulent between the nerves or sparsely appressed-pilose, or the upper glabrous; blades distant, 2 to 5 cm long, 3 to 4 mm wide,

FIGURE 1400.—*Panicum tenue.* Two views of spikelet, and floret, × 10. (Type.)

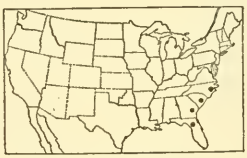

FIGURE 1401.—Distribution of *Panicum tenue.*

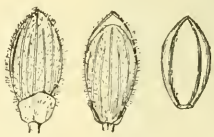

FIGURE 1402.—*Panicum albomarginatum.* Two views of spikelet, and floret, × 10. (Type.)

rather thick, the margin cartilaginous, puberulent beneath, glabrous on the upper surface; panicle 3 to 5 cm long; spikelets 1.6 to 1.7mm long, puberulent. Autumnal culms erect or leaning, sparingly branching from the middle nodes, the branches in small fascicles. 2l —Moist sandy woods, eastern North Carolina to northern Florida (fig. 1401).

74. Panicum albomarginátum Nash. (Fig. 1402.) Vernal culms 15 to 40 cm tall, ascending or spreading; leaves crowded at the base; blades thick and firm, those of the midculm 4 to 6 cm long, 4 to 6 mm wide, with a prominent white cartilaginous margin, the uppermost much reduced; panicle 3 to 6 cm long; spikelet 1.4 to 1.5 mm long, puberulent. Autumnal culms spreading, branching at the base,

forming bushy tufts. 2l —Low sandy soil, Coastal Plain, southeastern Virginia to Florida and Louisiana; Cuba; Guatemala (fig. 1403).

75. Panicum trifólium Nash. (Fig. 1404.) Vernal phase similar to that of *P. albomarginatum*, the culms more slender, 20 to 50 cm tall, the blades less crowded at the base, the upper blade not reduced. Autumnal culms erect or leaning, sparingly branching from the middle and upper nodes. 2l —Low mostly moist sandy woods, New Jersey to Florida and Louisiana (fig. 1405).

76. Panicum flavóvirens Nash. (Fig. 1406.) Vernal phase bright glossy green; culms very slender, ascending or spreading, 15 to 30 cm

FIGURE 1403.—Distribution of *Panicum albomarginatum.*

FIGURE 1404.—*Panicum trifolium.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1405.—Distribution of *Panicum trifolium.*

tall; blades 2 to 5 cm long, 3 to 4 mm wide, thin; panicle few-flowered; spikelets 1.3 to 1.4 mm long, pubescent. Autumnal culms spreading, decumbent or prostrate, branching from the lower and middle nodes. 2l —Moist shady or mucky soil, North Carolina to Florida and Mississippi (fig. 1407). *Panicum albomarginatum, P. trifolium,* and *P. flavovirens* form a series of closely allied species.

77. Panicum concínnius Hitchc. and Chase. (Fig. 1408.) Vernal phase bright green; culms very slender, 12 to 50 cm tall; blades 5 to 7 cm long, 5 to 6 mm wide; panicle 3 to 6 cm long; spikelets 1.1 mm long, pubescent. Autumnal culms radiate-spreading, late in

FIGURE 1406.—*Panicum flavovirens.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1407.—Distribution of *Panicum flavovirens.*

FIGURE 1408.—*Panicum concinnius.* Two views of spikelet, and floret, × 10. (Type.)

the season bearing a few branches, with somewhat reduced blades. 2l —Moist sandy ground, northern Georgia, Florida, and northern Alabama, rare.

78. Panicum ensifólium Baldw. (Fig. 1409.) Vernal culms 20 to 40 cm tall, erect or reclining; blades distant, often reflexed, 1 to 3 cm long, 1.5 to 3 cm wide, puberulent beneath, at least toward the tip; panicle 1.5 to 4 cm long; spikelets 1.3 to 1.5 mm long, glabrous or puberulent. Autumnal culms spreading or reclining, sparingly branching from the middle nodes, the branches mostly simple. 2l — Wet places, mostly sphagnum bogs or swamps, Coastal Plain, New Jersey to Florida and Louisiana (fig. 1410).

79. Panicum vernále Hitchc. and Chase. (Fig. 1411.) Vernal phase light green, soft in texture; culms 15 to 30 cm tall, very slender,

ascending or spreading; leaves clustered at the base; blades thin, 2 to 7 cm long, 3 to 5 mm wide, the culm blades smaller; panicle 1.5 to 3 cm long, few-flowered; spikelets 1.4 to 1.5 mm long, elliptic, subacute, pubescent. Autumnal phase like the vernal in appearance, branching from the base, these culms simple and soon dying to the ground, rarely late in the season producing a few short fascicled branchlets from the nodes, the scarcely reduced flat blades spreading. 2↓ —Moist places, especially sphagnum bogs, Florida to Mississippi.

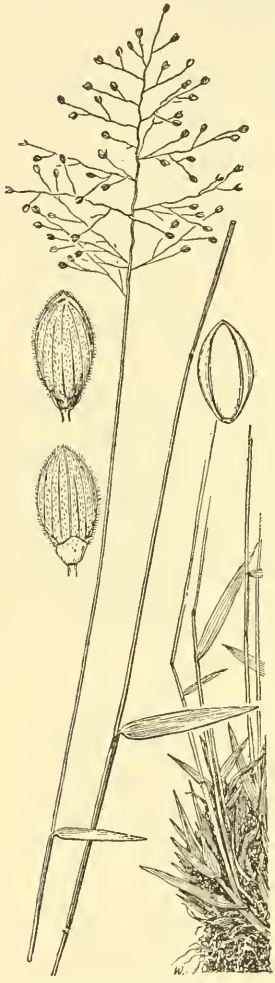

FIGURE 1409.—*Panicum ensifolium.* Plant, × 1; two views of spikelet, and floret, × 10. (Biltmore Herb., N.C.)

FIGURE 1410.—Distribution of *Panicum ensifolium.*

FIGURE 1411.—*Panicum vernale.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1412.—*Panicum curtifolium.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1413.—Distribution of *Panicum curtifolium.*

FIGURE 1414.—*Panicum chamaelonche.* Two views of spikelet, and floret, × 10. (Type.)

80. Panicum curtifólium Nash. (Fig. 1412.) Vernal culms 10 to 30 cm tall, slender, weak, angled, erect or spreading, sheaths striate-angled, sparsely pilose; ligule about 1 mm long; blades spreading or reflexed, 1.5 to 3 cm long, 2 to 5 mm wide, thin, soft, sparsely pilose on both surfaces or nearly glabrous above; panicle 2 to 3 cm long; spikelets 1.4 mm long, glabrous or minutely pubescent. Autumnal culms weakly spreading, branching from the middle nodes, the ultimate branches in small fascicles toward the summit of the culm. 2↓ —Boggy soil and shady moist places, sometimes forming a rather dense carpet, South Carolina to Tennessee, south to Florida and Louisiana (fig. 1413).

81. Panicum chamaelónche Trin. (Fig. 1414.) Vernal culms densely tufted, 10 to 20 cm tall, ascending; blades firm, ascending or spreading, 1.5 to 4 cm long, 2 to 3 mm wide; panicle 2.5 to 5 cm long; spikelets 1.1 to 1.2 mm long, glabrous. Autumnal culms freely

branching from the base and lower nodes, forming dense cushions as much as 50 cm across. 2l —Open sandy soil in low pine land North Carolina to Florida and Mississippi; Isla de Pinos (fig. 1415).

82. Panicum glabrifólium Nash. (Fig. 1416.) Vernal phase similar to that of *P. chamaelonche;* culms stouter, 15 to 50 cm tall, mostly erect; blades erect, 4 to 12 cm long, 2 to 4 mm wide, usually involute; panicle 4 to 9 cm long; spikelets 1.2 to 1.4 mm long, glabrous. Autumnal culms wiry, elongate, spreading, freely branching from the middle and upper nodes, the blades long and narrow. 2l —Low sandy woods, peninsular Florida. Closely allied to *P. chamaelonche* but taller and with different autumnal phase.

83. Panicum bréve Hitchc. and Chase. (Fig. 1417.) Vernal phase purplish; culms 5 to 15 cm tall, erect, stiff and wiry; sheaths

FIGURE 1416.—*Panicum glabrifolium.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1415.—Distribution of *Panicum chamaelonche.*

FIGURE 1417.—*Panicum breve.* Two views of spikelet, and floret, × 10. (Type.)

crowded at the base; blades erect, 3 to 6 cm. long, strongly involute, with a few stiff hairs at the base; panicle 1.5 to 4 cm long; spikelets 1.3 to 1.4 mm long, puberulent. Autumnal phase erect, branching from the middle nodes, the fascicled branches strict. 2l —Low pine woods and hammocks, east coast of southern Florida.

12. Lanceária.—Olive green, often purplish; vernal culms usually wiry; ligules nearly obsolete; blades usually ciliate toward base; spikelets asymmetrically pyriform, strongly 7- to 9-nerved. Autumnal culms spreading, freely branching.

84. Panicum portoricénse Desv. (Fig. 1418.) Vernal culms 15 to 30 cm tall, slender; crisp-puberulent to nearly glabrous; sheaths

FIGURE 1418.—*Panicum portoricense.* Two views of spikelet, and floret, × 10. (Ashe, N.C.)

FIGURE 1419.—Distribution of *Panicum portoricense.*

glabrous or crisp-puberulent; blades firm, 2 to 5 cm long, 3 to 6 mm wide, glabrous to puberulent; panicle 2 to 4 cm long; spikelets 1.5 to 1.6 mm long, puberulent. Autumnal culms branching from all but the uppermost node, the reduced blades involute-pointed. 2l (*P. pauciciliatum* Ashe.)—Sandy woods of the Coastal Plain, mostly in moist places, North Carolina to Florida and Texas; Cuba; Puerto Rico (fig. 1419).

85. Panicum lanceárium Trin. (Fig. 1420.) Vernal culms 20 to 50 cm tall, minutely grayish crisp-puberulent; sheaths puberulent; blades firm, 2 to 6 cm long, 3 to 7 mm wide, usually glabrous on the upper surface, puberulent or nearly glabrous beneath; panicle 3 to 6 cm long; spikelets 2 to 2.1 mm long, glabrous or usually puberulent.

Autumnal culms geniculate-spreading, branching from the middle nodes. ♃ —Low sandy woods, Coastal Plain, southeastern Virginia to Florida and Texas; Cuba; Hispaniola; British Honduras (fig. 1421).

FIGURE 1420.—*Panicum lancearium.* Plant, × 1; two views of spikelet, and floret, × 10. (Chase 4545, S.C.)

86. Panicum pátulum (Scribn. and Merr.) Hitchc. (Fig. 1422.) Vernal phase grayish olive-green; culms geniculate-decumbent, as much as 50 cm long, internodes and sheaths densely velvety-puberulent; blades rather lax, spreading, 4 to 8 cm long, 4 to 8 mm wide, velvety-puberulent beneath, pubescent above, ciliate at least half their length; spikelets as in *P. lancearium* but densely pubescent. Autumnal culms more freely branching than in *P. lancearium*, often forming large mats. ♃ —Low moist woods, Coastal Plain, southeastern Virginia to Florida and Louisiana (fig. 1423).

87. Panicum webberiánum Nash. (Fig. 1424.) Vernal phase usually purplish; culms rather stout, erect or ascending, 20 to 50 cm tall, minutely puberulent to glabrous; leaves somewhat crowded below; sheaths glabrous or nearly so; blades firm, ascending, often incurved or spoon-shaped, 3 to 9 cm long, 4 to 12 mm wide, usually ciliate at the subcordate base, glabrous; panicle 4 to 10 cm long; spikelets 2.3 to 2.5 mm long, purple-stained at base, glabrous or minutely pubescent. Autumnal culms spreading or decumbent, flabellately

FIGURE 1421.—Distribution of *Panicum lancearium.*

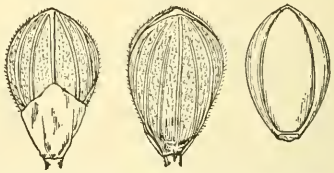

FIGURE 1422.—*Panicum patulum.* Two views of spikelet, and floret, × 10. (Type.)

branched at the middle and upper nodes. ♃ —Low pineland, North Carolina, Georgia, and Florida.

88. Panicum patentifólium Nash. (Fig. 1425.) Vernal culms widely decumbent-ascending, slender, 25 to 55 cm tall, minutely

puberulent to nearly glabrous; blades stiffly spreading, 2.5 to 8 cm long, 2 to 5 mm wide, glabrous; panicle 3 to 7 cm long; spikelets 2.4 to 2.6 mm long, obovate, turgid, puberulent to nearly glabrous. Autumnal phase, decumbent or spreading, branching from the middle and upper nodes, the branches appressed. ♃ —Dry sand, espe-

FIGURE 1423.—Distribution of *Panicum patulum.*

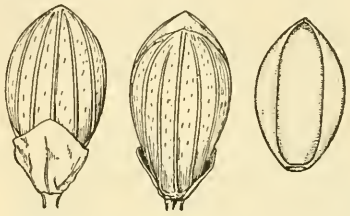

FIGURE 1424.—*Panicum webberianum.* Two views of spikelet, and floret, × 10. (Type.)

cially in "scrub", Georgia to Florida and Mississippi (fig. 1426).

13. Oligosánthia.—Culms mostly relatively stout, usually erect; ligules inconspicuous except in *P. ravenelii;* blades firm; spikelets turgid, strongly 7- to 9-nerved. Autumnal culms with branches more or less crowded toward the summit.

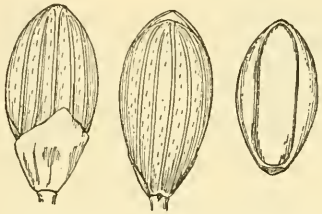

FIGURE 1425.—*Panicum patentifolium.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1426.—Distribution of *Panicum patentifolium.*

89. Panicum wilcoxiánum Vasey. (Fig. 1427.) Vernal culms 10 to 25 cm tall, copiously papillose-hirsute, as are sheaths and blades; ligule 1 mm long; blades firm, erect, 5 to 8 cm long, 3 to 6 mm wide, usually involute-acuminate; panicle 2 to 5 cm long; spikelets 2.7 to

FIGURE 1428.—Distribution of *Panicum wilcoxianum.*

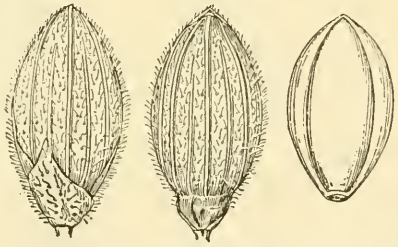

FIGURE 1427.—*Panicum wilcoxianum.* Two views of spikelet, and floret, × 10. (Type.)

3 mm long, papillose-pubescent. Autumnal culms branching from all the nodes, forming bushy tufts with rigid erect blades. ♃ — Prairies, Manitoba, and North Dakota to Illinois and Kansas; New Mexico (fig. 1428).

90. Panicum malacophýllum Nash. (Fig. 1429.) Vernal phase velvety or velvety-pilose throughout; culms slender, 25 to 70 cm tall, ascending or spreading, the nodes retrorsely bearded; ligule 1 to 1.5 mm long; blades 7 to 10 cm long, 6 to 12 mm wide; panicle 3 to 7 cm long; spikelets 2.9 to 3 mm long, papillose-pilose. Autumnal phase spreading, forming bushy topheavy clumps with reduced blades. 2↓ —Sandy woods, Tennessee to Kansas and Texas (fig. 1430).

91. Panicum helléri Nash. (Fig. 1431.) Vernal culms 25 to 60 cm tall, ascending or spreading, appressed-pilose below, often glab-

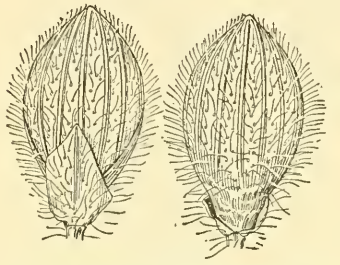

FIGURE 1429.—*Panicum malacophyllum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1430.—Distribution of *Panicum malacophyllum.*

rous above; sheaths sparsely papillose-hispid to glabrous; blades rather thin, glabrous on both surfaces or pubescent beneath, ciliate toward the base; panicle 6 to 12 cm long; spikelets 2.9 to 3 mm long, glabrous or with a few scattered hairs. Autumnal phase branching at all but the lowest nodes, forming loose sprawling tufts, the blades widely spreading, not much reduced, the long-pediceled spikelets rather conspicuous among the foliage. 2↓ —Open woods and prairies, Missouri and Oklahoma to Louisiana and New Mexico (fig. 1432). Closely related to *P. scribnerianum.*

FIGURE 1432.—Distribution of *Panicum helleri.*

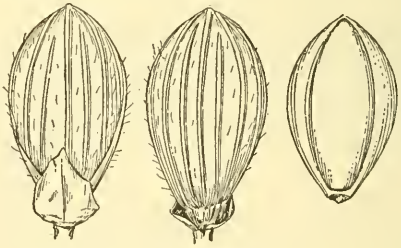

FIGURE 1431.—*Panicum helleri.* Two views of spikelet, and floret, × 10. (Type.)

92. Panicum scribneriánum Nash. (Fig. 1433.) Vernal culms 20 to 50 cm tall, glabrous or harshly puberulent or sometimes ascending-pilose; sheaths striate, papillose-hispid to nearly glabrous; blades ascending or erect, 5 to 10 cm long, 6 to 12 mm wide, firm, rounded at the ciliate base, glabrous on the upper surface, appressed-pubescent to glabrous beneath; panicle 4 to 8 cm long; spikelets 3.2 to 3.3 mm long, obovate, blunt, sparsely pubescent to nearly glabrous. Autumnal phase branching from the middle and upper nodes. 2↓ —Sandy soil or dry prairies, Maine to British Columbia, south to Maryland, Tennessee, Texas, and Arizona (fig. 1434).

93. Panicum oligosánthes Schult. (Fig. 1435.) Vernal culms 35 to 80 cm tall, appressed-pubescent, especially below; sheaths with ascending papillose pubescence; blades stiffly spreading or ascending, 6 to 14 cm long, 5 to 8 mm wide, glabrous or nearly so on the upper

FIGURE 1433.—*Panicum scribnerianum.* Plant, × 1; two views of spikelet, and floret, × 10. (Vernal phase, McDonald 32, Ill.; autumnal phase, Umbach 2365, Ill.)

surface, harshly puberulent beneath; panicle 6 to 12 cm long; spikelets long-pediceled, 3.5 to 4 mm long, subacute, sparsely hirsute. Autumnal phase erect to spreading, branching freely from the upper nodes. 2|. — Sandy, usually moist woods, Massachusetts to Missouri, south to Florida and Texas (fig. 1436).

FIGURE 1434.—Distribution of *Panicum scribnerianum.*

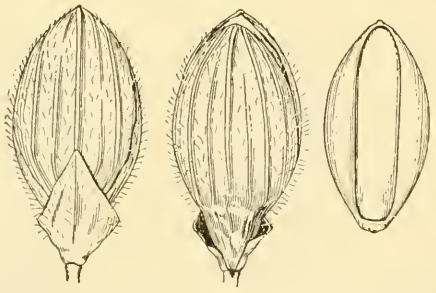

FIGURE 1435.—*Panicum oligosanthes.* Two views of spikelet, and floret, × 10. (Type.)

94. Panicum ravenélii Scribn. and Merr. (Fig. 1437.) Vernal culms 30 to 70 cm tall, densely papillose-hirsute with ascending hairs, the nodes short-bearded; sheaths hirsute like the culm; ligule 3 to 4 mm long; blades thick, 8 to 15 cm long, 1 to 2 cm wide, glabrous on the upper surface, densely velvety-hirsute beneath; panicle 7 to 12

cm long; spikelets 4 to 4.3 mm long, sparsely papillose-pubescent. Autumnal phase more or less spreading, branching from the middle

FIGURE 1436.—Distribution of *Panicum oligosanthes.*

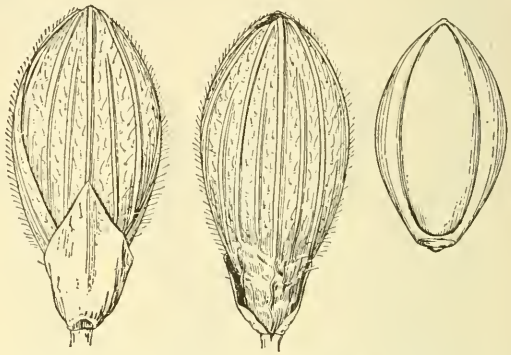

FIGURE 1437.—*Panicum ravenelii.* Two views of spikelet, and floret, × 10. (Type.)

and upper nodes, the short branches crowded at the summit. 2l — Sandy or gravelly woods or open ground, Delaware to Missouri, south to Florida and Texas (fig. 1438).

95. Panicum leibérgii (Vasey) Scribn. (Fig. 1439.) Vernal culms slender, 25 to 75 cm tall, erect from a more or less geniculate base, pilose or scabrous; sheaths papillose-hispid with spreading hairs; ligule obsolete or nearly so; blades ascending or erect, rather thin, 6 to 15 cm long, 7 to 15 mm wide, papillose-hispid on both surfaces, often sparsely so above; panicle 8 to 15 cm long, less than half as wide; spikelets 3.7 to 4 mm long, strongly papillose-hispid. Autumnal phase leaning, sparingly branching from the middle and lower nodes. 2l —Prairies, New York to Manitoba and North Dakota, south to Indiana and Kansas (fig. 1440).

FIGURE 1438.—Distribution of *Panicum ravenelii.*

96. Panicum xanthophýsum A. Gray. (Fig. 1441.) Vernal phase

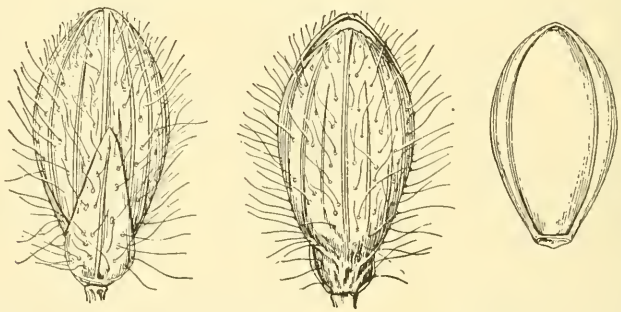

FIGURE 1439.—*Panicum leibergii.* Two views of spikelet, and floret, × 10. (Type.)

yellowish green; culms 20 to 55 cm tall, more or less scabrous; sheaths sparsely papillose-pilose; blades erect or nearly so, rather thin, prominently nerved, 10 to 15 cm long, 1 to 2 cm wide, glabrous except the ciliate base; panicle 5 to 12 cm long, very narrow, few-flowered,

the stiff branches erect or nearly so; spikelets 3.7 to 4 mm long, blunt, pubescent. Autumnal phase erect or ascending, branching from the second and third nodes, the branches erect, mostly simple. 2l — Sandy or gravelly soil, Quebec to Manitoba, south to Pennsylvania and Minnesota (fig. 1442).

FIGURE 1440.—Distribution of *Panicum leibergii.*

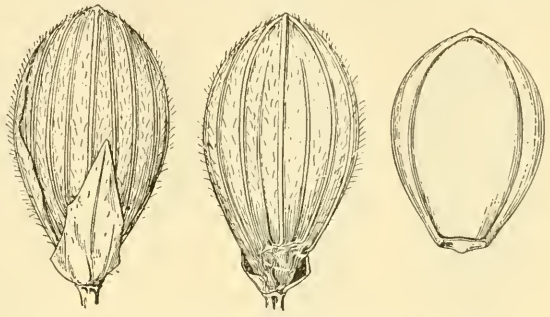

FIGURE 1441.—*Panicum xanthophysum.* Two views of spikelet, and floret, × 10. (Type.)

14. Pedicellàta.—Culms slender from a knotted crown; sheaths papillose-hirsute; ligules about 1 mm long; blades long-ciliate at least toward base; spikelets attenuate at base, 7- to 9-nerved, papillose-pubescent. Autumnal culms freely branching, the branches appearing before the maturity of the primary panicle; no distinct winter rosette formed.

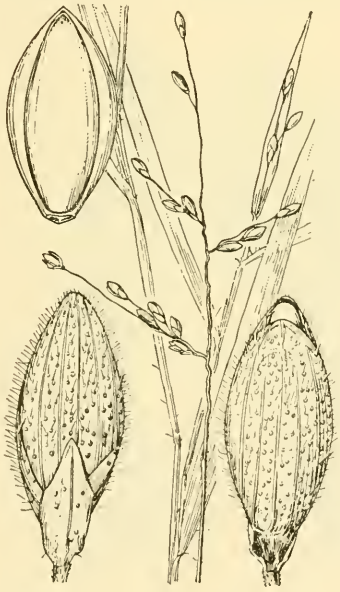

FIGURE 1443.—*Panicum pedicellatum.* Plant, × 1; two views of spikelet, and floret, × 10. (Heller, Tex.)

97. Panicum pedicellàtum Vasey. (Fig. 1443.) Vernal culms erect or ascending, 20 to 50 cm tall, usually ascending-hirsute at least below; blades 5 to 9 cm long, 3 to 6 mm wide, glabrous or sometimes minutely hispid; panicle 3 to 6 cm long; spikelets 3.5 to 3.7 mm long, elliptic; first glume about half as long as the spikelet, acute, the second shorter than the fruit. Autumnal culms erect or leaning, branching from all but the uppermost nodes, the branches spreading. 2l —Dry woods and prairies, central and southern Texas.

FIGURE 1442.—Distribution of *Panicum xanthophysum.*

98. Panicum nodàtum Hitchc. and Chase. (Fig. 1444.) Vernal culms tufted, ascending or spreading, hard and wiry, 25 to 35 cm tall, finely papillose, crisp-puberulent; blades firm, ascending, 3 to 5 cm long, 3 to 6 mm wide, puberulent on both surfaces; panicle 4 to 5 cm long, few-flowered; spikelets 4 mm long, pyriform. Autumnal culms widely geniculate-decumbent, branching from all but the uppermost node, the branches somewhat divaricate, the nodes of the main culm swollen. 2l — Oak woods in sand dunes, southern Texas and northern Mexico.

15. Scopária.—Species of various habit, vernal culms tall; ligules 1 mm long or less; blades elongate, spikelets abruptly pointed, 7- to 9-nerved; autumnal culms branching from the middle or upper nodes.

99. Panicum scopárium Lam. (Fig. 1445.) Vernal phase grayish olive-green, velvety-pubescent throughout except on a viscid ring below the nodes and at the summit of the sheath; culms 80 to 130 cm tall, stout, erect or ascending, usually geniculate at base; blades rather thick, 12 to 20 cm long, 10 to 18 mm wide; panicle 8 to 15 cm long, the axis and branches with viscid blotches; spikelets 2.4 to 2.6 mm long, obovate, turgid, papillose-pubescent. Autumnal phase leaning or spreading, freely branching from the middle nodes, forming flabellate fascicles. 2↓ — Wet or damp soil, Massachusetts to Florida, west through Kentucky to Missouri, Oklahoma, and Texas; Cuba (fig. 1446).

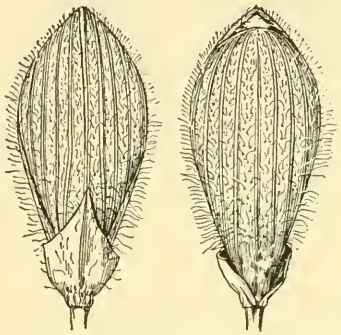

FIGURE 1444.—*Panicum nodatum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1445.—*Panicum scoparium.* Plant, × 1; two views of spikelet, and floret, × 10. (McGregor, 212, S.C.)

100. Panicum aculeátum Hitchc. and Chase. (Fig. 1447.) Vernal culms in large clumps, slender, 70 to 100 cm tall, ascending, scabrous, harshly pubescent below; sheaths papillose-hispid with stiff sharp-pointed hairs, a puberulent ring at the summit, the uppermost usually

glabrous; blades firm, stiffly ascending or spreading, 12 to 20 cm long, 9 to 13 mm wide, scabrous on the upper surface and toward the apex beneath; panicle 8 to 12 cm long, few-flowered; spikelets 3 mm long, elliptic, minutely pubescent, pointed beyond the fruit. Autumnal culms branching from the middle nodes, the branches more or less

FIGURE 1446.—Distribution of *Panicum scoparium.*

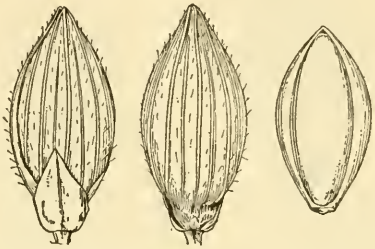

FIGURE 1447.—*Panicum aculeatum.* Two views of spikelet, and floret, × 10. (Type.)

divaricate, the ultimate panicles wholly or partly included in the sheaths. 2l —Swampy woods, Connecticut to North Carolina, rare (fig. 1448).

101. Panicum scabriúsculum Ell. (Fig. 1449.) Vernal phase grayish olive green; culms erect, 1 to 1.5 m tall, scabrous at least below the nodes, sometimes puberulent; sheaths glabrous or more or less

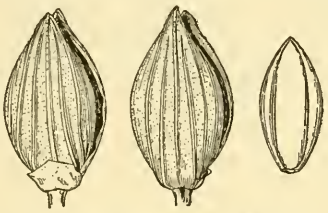

FIGURE 1449.—*Panicum scabriusculum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1448.—Distribution of *Panicum aculeatum.*

hispid at least toward the summit, often mottled or white-spotted, commonly swollen at the base and contracted toward the summit; blades stiffly ascending or spreading, often reflexed, 15 to 25 cm long, 9 to 12 mm wide, glabrous or scabrous, often more or less pubescent beneath, tapering to an involute point; panicle 10 to 20 cm long; spikelets 2.3 to 2.6 mm long, ovate, glabrous or obscurely puberulent. Autumnal culms erect, branching from the middle and upper nodes, the branches appressed, finally forming dense oblong masses along the upper part of the primary culm, the panicles partly or entirely enclosed in the sheaths. 2l —Moist ground, especially along ditches, streams, and swamps, Coastal Plain, New Jersey to Florida and Texas (fig. 1450)

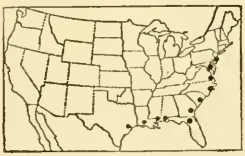

FIGURE 1450.—Distribution of *Panicum scabriusculum.*

102. Panicum cryptánthum Ashe. (Fig. 1451.) Vernal culms erect, 80 to 100 cm tall, glabrous except the usually bearded nodes; sheaths glabrous or the lowermost sparsely hirsute, the upper somewhat inflated; blades stiff, glabrous, sparingly ciliate at base, 10 to

15 cm long, 7 to 9 mm wide; panicle 6 to 10 cm long, the axis and ascending branches viscid-spotted; spikelets 2.2 to 2.4 mm long, lanceolate-elliptic, pointed. Autumnal culms erect, sparingly branching from the middle nodes, the panicles partly hidden in the sheaths. 2↓ —Low swampy ground, New Jersey; North Carolina to Florida; Texas; rare (fig. 1452).

16. Commutáta.—Culms relatively stout, glabrous or puberulent; ligules obsolete or nearly so; blades cordate and more or less ciliate at base; spikelets elliptic, not very turgid, 7- to 9-nerved, pubescent. Autumnal culms usually rather sparingly branching.

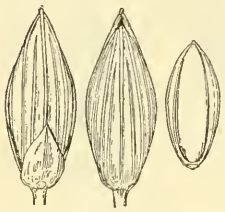

FIGURE 1451.—*Panicum cryptanthum.* Two views of spikelet, and floret, × 10. (Type.)

103. Panicum áshei Pearson. (Fig. 1453.) Vernal phase usually purplish, from a knotted crown; culms 25 to 50 cm tall, erect, stiff and wiry, densely crisp-puberulent; sheaths less densely puberulent; blades rather thick and firm, 4 to 8 cm long, 5 to 10 mm wide, glabrous; panicle 5 to 8 cm long, loosely flowered; spikelets 2.4 to 2.7 mm long. Autumnal culms erect or topheavy-reclining, bearing divergent branches from the middle and upper nodes or from the upper nodes only. 2↓ —Dry, especially rocky woods, Massachusetts to Michigan and Missouri, south to northern Florida, Mississippi, and Oklahoma (fig. 1454).

FIGURE 1452.—Distribution of *Panicum cryptanthum.*

104. Panicum commutátum Schult. (Fig. 1455.) Vernal culms 40 to 75 cm tall, erect; sheaths glabrous or nearly so; blades 5 to 12 cm long, 12 to 25 mm wide, glabrous on both surfaces or puberulent beneath; panicle 6 to 12 cm long; spikelets 2.6 to 2.8 mm long. Autumnal culms erect or leaning, branching from the middle nodes, the secondary branches crowded toward the summit. 2↓ —Woods and copses, Massachusetts to Michigan and Missouri, south to Florida and Texas (fig. 1456).

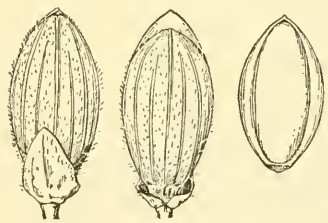

FIGURE 1453.—*Panicum ashei.* Two views of spikelet, and floret, × 10. (Type coll.)

FIGURE 1454.—Distribution of *Panicum ashei.*

105. Panicum mutábile Scribn. and Smith. (Fig. 1457.) Vernal phase blue green, glaucous; culms solitary or few in a tuft, erect, 30 to 70 cm tall; sheaths glabrous; blades horizontally spreading, 6 to 15 cm long, 8 to 20 mm wide, tapering to both ends, glabrous, ciliate toward the cordate base or the lower ciliate nearly to apex; panicle 7 to 15 cm long; spikelets 2.9 to 3 mm long. Autumnal culms erect or reclining, sparingly branched from the middle and upper nodes. 2↓ —Sandy pine woods or hammocks, Coastal Plain, southeastern Virginia to Florida and Mississippi (fig. 1458).

106. Panicum joórii Vasey. (Fig. 1459.) Vernal culms 20 to 55 cm tall, slender, spreading or ascending from a decumbent base, at least

the lower internodes purplish red; sheaths glabrous; blades 6 to 15 cm long, 7 to 18 mm wide, thin, often subfalcate, glabrous on both surfaces; panicle loosely flowered, 5 to 9 cm long; spikelets 3 to 3.1 mm long. Autumnal culms widely spreading, bearing more or less

FIGURE 1455.—*Panicum commutatum.* Plant, × 1; two views of spikelet, and floret, × 10. (Bock and Chase 118, Ill.)

divaricate branches from all the nodes, the ultimate branches in short dense fascicles. 2l —Low or swampy woods, Coastal Plain, southeastern Virginia to Florida, west to Arkansas and Texas; Mexico (fig. 1460).

107. Panicum equilaterâle Scribn. (Fig. 1461.) Vernal culms 25 to 70 cm tall, stiff and erect; sheaths glabrous, the upper two often approximate; blades firm, widely spreading, 6 to 17 cm long, 6 to 14 mm wide, the margins nearly parallel, glabrous, often ciliate at the rounded or subcordate base; panicle 5 to 10 cm long; spikelets 3.2 mm long. Autumnal culms erect or leaning, branching from the upper and middle nodes. 2l —Pinelands, hammocks, and sandy woods, Coastal Plain, North Carolina, South Carolina, and Florida.

FIGURE 1456.—Distribution of *Panicum commutatum.*

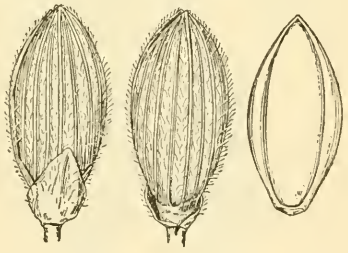

FIGURE 1457.—*Panicum mutabile.* Two views of spikelet, and floret, × 10. (Type.)

17. Latifólia.—Culms rather stout, erect or suberect; ligules not more than 1 mm long; blades cordate, clasping; spikelets rather turgid, 7- to 9-nerved, pubescent. Autumnal phase usually rather sparingly branching.

108. Panicum clandestínum L. (Fig. 1462.) Vernal culms in large dense clumps, sometimes with strong rhizomes 5 to 10 cm long,

FIGURE 1458.—Distribution of *Panicum mutabile.*

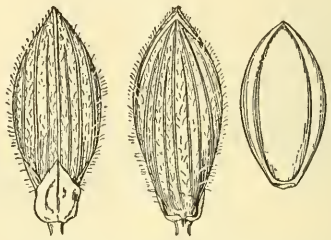

FIGURE 1459.—*Panicum joorii.* Two views of spikelet, and floret, × 10 (Type.)

70 to 150 cm tall, scabrous to papillose-hispid at least below the nodes; sheaths strongly papillose-hispid to nearly glabrous; blades spreading or finally reflexed, 10 to 20 cm long, 1.2 to 3 cm wide, scabrous on both

FIGURE 1460.—Distribution of *Panicum joorii.*

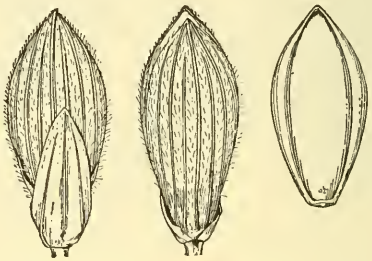

FIGURE 1461.—*Panicum equilaterale.* Two views of spikelet, and floret, × 10. (Type.)

surfaces, at least toward the end, usually ciliate at base; panicle 8 to 15 cm long; spikelets 2.7 to 3 mm long. Autumnal culms erect or leaning, the branches leafy, the swollen bristly sheaths overlapping and wholly or partly enclosing the panicles. 2l —Moist mostly sandy

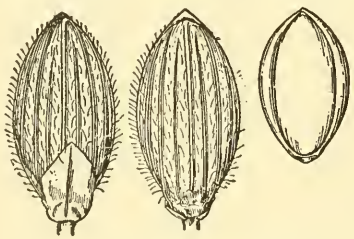

FIGURE 1462.—*Panicum clandestinum.* Two views of spikelet, and floret, × 10. (Torrey, N.Y.)

FIGURE 1463.—Distribution of *Panicum clandestinum.*

ground, Nova Scotia and Quebec to Kansas, south to northern Florida and Texas (fig. 1463).

109. Panicum latifólium L. (Fig. 1464.) Vernal culms from a knotted crown; culms 45 to 100 cm tall, glabrous or the lower part

sparsely pubescent; sheaths ciliate; blades 8 to 18 cm long, 1.5 to 4 cm wide, glabrous; panicle 7 to 15 cm long; spikelets 3.4 to 3.7 mm long. Autumnal culms more or less spreading, branching from the middle nodes, the upper leaves of the branches crowded and spread-

FIGURE 1464.—*Panicum latifolium.* Plant, × 1; two views of spikelet, and floret, × 10. (Schenck, Ill.)

ing, not much reduced. ♃ —Rocky or sandy woods, Maine and Quebec to Minnesota, south to North Carolina and Kansas (fig. 1465).

110. Panicum bóscii Poir. (Fig. 1466.) Vernal phase resembling that of *P. latifolium;* culms 40 to 70 cm tall, glabrous or minutely puberulent, the nodes retrorsely bearded; sheaths glabrous or nearly

FIGURE 1465.—Distribution of *Panicum latifolium.*

FIGURE 1467.—Distribution of *Panicum boscii.*

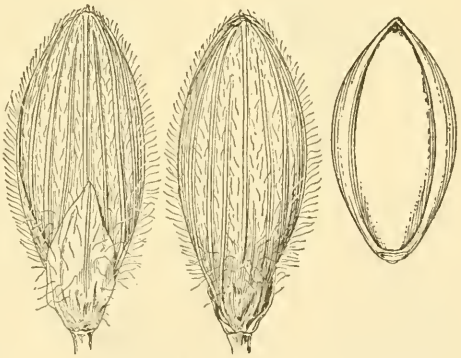

FIGURE 1466.—*Panicum boscii.* Two views of spikelet, and floret, × 10. (Type.)

so; blades spreading, 7 to 12 cm long, 1.5 to 3 cm wide, sparsely ciliate at base, glabrous or nearly so; panicle 6 to 12 cm long; spikelets 4 to 4.5 mm long, about half as wide, papillose-pubescent. Autumnal phase about as in *P. latifolium,* sometimes topheavy-reclining. ♃ —Woods, Massachusetts to Wisconsin and Oklahoma, south to northern Florida and Texas (fig. 1467). PANICUM BOSCII var.

FIGURE 1468.—*Panicum geminatum.* Plant, × ½; two views of spikelet, and floret, × 10. (Tracy 9395, Fla.)

MÓLLE (Vasey) Hitchc. and Chase. Differing from *P. boscii* in the downy-villous culms and sheaths and the velvety blades. 2↓ — About the same range as the species.

SUBGENUS 3. EUPÁNICUM Godr.

Spikelets in open or condensed panicles or in spikelike racemes, the branchlets not produced as bristles (the naked tip forming a short point in Geminata); not presenting vernal and autumnal phases of a distinctive character, with winter rosettes of leaves different from the culm leaves.

1. **Geminâta.**—Subaquatic glabrous perennials; inflorescence of several erect, spikelike racemes distant on an elongate axis; rachis ending in a short naked point; spikelets subsessile, abruptly pointed, glabrous, first glume truncate; fruit transversely rugose.

111. Panicum geminâtum Forsk. (Fig. 1468.) Culms tufted, 25 to 80 cm tall, scarcely succulent, often decumbent at base or with stolons rooting at the nodes; blades 10 to 20 cm long, 3 to 6 mm wide, flat, or involute toward the apex; panicle 12 to 30 cm long, the appressed racemes 12 to 18, the lower 2.5 to 3 cm long, the upper gradually shorter; spikelets 2.2 to 2.4 mm long, 5-nerved. 2↓ —Moist ground or shallow water, mostly near the coast, southern Florida, Louisiana, and Texas; warmer regions of both hemispheres.

112. Panicum paludívagum Hitchc. and Chase. (Fig. 1469.) Resembling *P. geminatum*, but the culms elongate from a long creeping rooting base, rather succulent, as much as 2 m long, the lower part submerged, loosely branching; blades 15 to 40 cm long, scabrous on the upper surface; spikelets 2.8 to 3 mm long, faintly 3-nerved; fruit obscurely rugose. 2↓ —More or less submerged in freshwater rivers and lakes, Florida, Texas; Mexico, Guatemala.

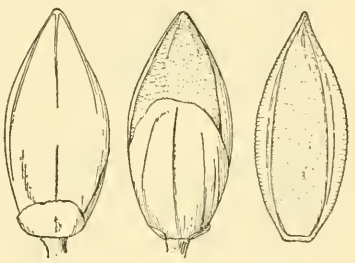

FIGURE 1469.—*Panicum paludivagum*. Two views of spikelet, and floret, × 10. (Type.)

2. **Purpurascéntia.**—Stoloniferous robust perennial; a single species introduced.

113. Panicum purpuráscens Raddi. PARA GRASS. (Fig. 1470.) Culms decumbent and rooting at base, 2 to 5 m long, the nodes densely villous; sheaths villous or the upper glabrous, densely pubescent on the collar; blades 10 to 30 cm long, 10 to 15 mm wide, flat, glabrous; panicle 12 to 20 cm long, the rather distant subracemose densely flowered branches ascending or spreading; spikelets subsessile, 3 mm long, elliptic, 5-nerved, glabrous; fruit minutely transversely rugose. 2↓ (*P. barbinode* Trin.)—Cultivated and waste ground in moist soil, borders of rivers, marshes, and swamps, Florida, Alabama (Mobile), Texas; Oregon (Linnton); throughout tropical America at low altitudes. Commonly cultivated in tropical America as a forage grass, being cut for green feed. It probably was introduced into Brazil at an eary date from Africa.

3. **Fasciculâta.**—Branching annuals; blades flat; ligules not more than 1 mm long; panicles of ascending spikelike racemes along an angled axis; spikelets subsessile, abruptly pointed strongly 5- to 7-nerved; fruit transversely rugose.

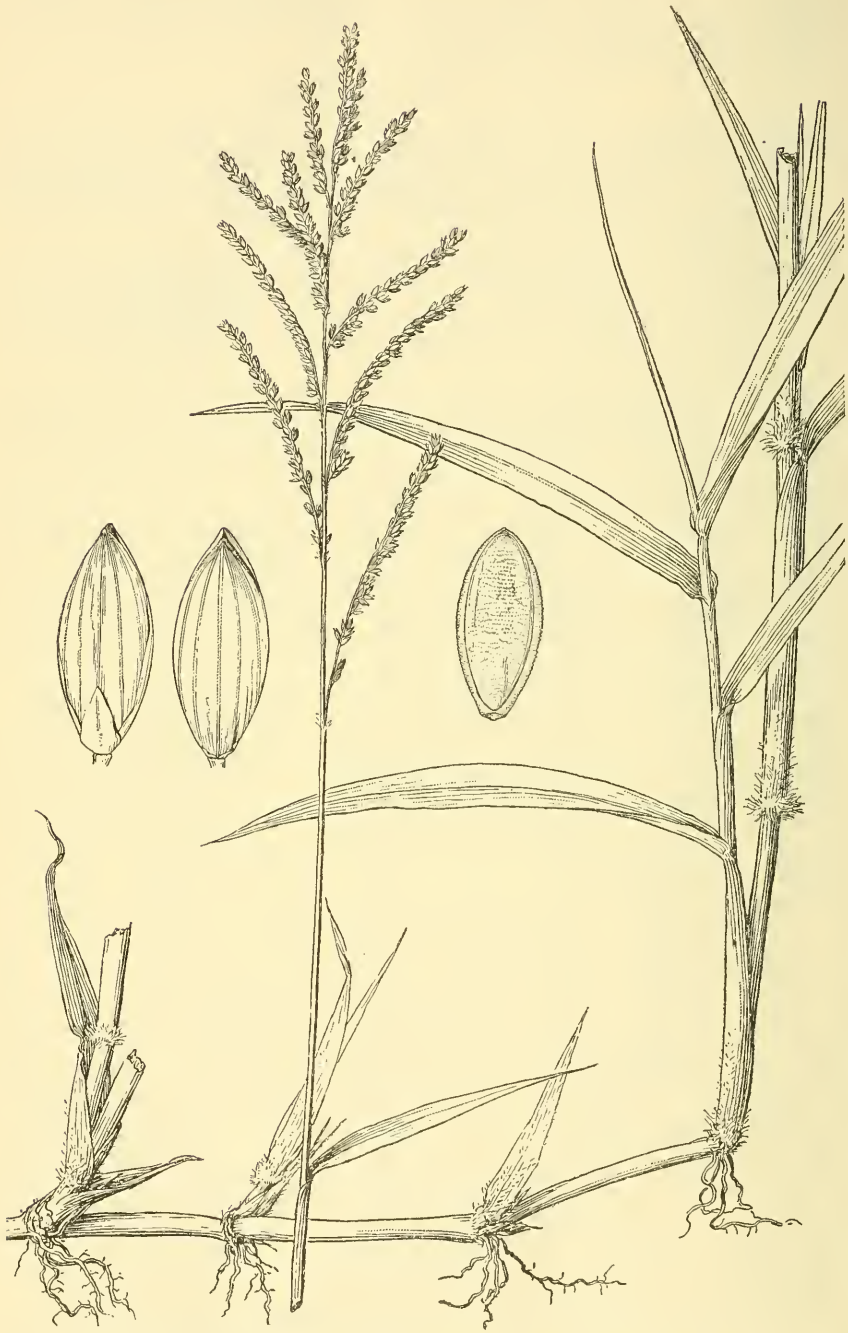

FIGURE 1470.—*Panicum purpurascens.* Plant, × ½; two views of spikelet, and floret, × 10. (Hitchcock 9693, Jamaica.)

114. Panicum réptans L. (Fig. 1471.) Culms ascending 10 to 30 cm above the creeping base; blades 1.5 to 6 cm long, 4 to 12 mm wide, cordate, usually glabrous, ciliate on the undulate margin at base; panicle 2 to 6 cm long, the 3 to 12 ascending or spreading racemes 2

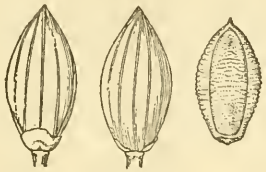

FIGURE 1471.—*Panicum reptans.* Two views of spikelet, and floret, × 10. (Type of *P. prostratum* Lam.)

FIGURE 1472.—Distribution of *Panicum reptans.*

to 3 cm long, aggregate, the rachis usually pilose with long weak hairs; spikelets secund, about 2 mm long, glabrous, on pubescent pedicels about 1 mm; first glume very short, truncate or rounded. ⊙ —Moist open ground, or a weed in cultivated fields, Florida to Texas (fig. 1472); tropical regions of both hemispheres.

FIGURE 1474.—Distribution of *Panicum fasciculatum.*

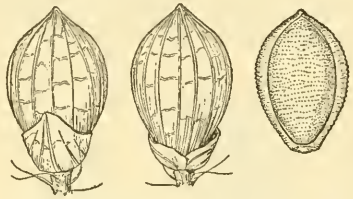

FIGURE 1473.—*Panicum fasciculatum.* Two views of spikelet, and floret, × 10. (Type.)

115. Panicum fasciculátum Swartz. BROWNTOP MILLET. (Fig. 1473.) Culms erect or spreading from a decumbent base, 30 to 100 cm tall, sometimes pubescent below the panicle or hispid below the appressed-pubescent nodes, the more robust freely branched from the lower nodes; sheaths glabrous to papillose-hispid; blades 4 to 30 cm

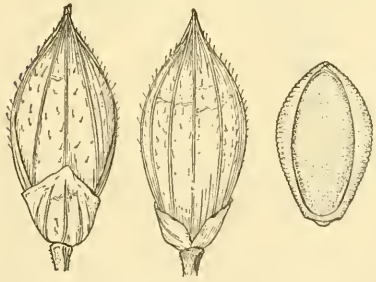

FIGURE 1475.—*Panicum adspersum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1476.—*Panicum arizonicum.* Two views of spikelet, and floret, × 10. (Palmer 159, Mex.)

long, 6 to 20 mm wide, glabrous; panicle 5 to 15 cm long; the racemes 5 to 10 cm long; spikelets yellow or bronze-brown, 2.1 to 2.5 mm long, rarely 3 mm, obovate, turgid, glabrous, strongly transversely wrinkled

or veined. ⊙ —Moist open ground, often a weed in fields, southern Florida, southern Texas; tropical America, at low altitudes (fig. 1474).

PANICUM FASCICULATUM var. RETICULÁTUM (Torr.) Beal. Differing from *P. fasciculatum* in having smaller more compact panicles, narrower pubescent blades, less regular suberect racemes and larger, mostly mare yellowish spikelets 2.6 to 3 mm long. Many intergrades occur. ⊙ (This has been erroneously referred to *P. fasciculatum* var. *chartaginense* (Swartz) Doell.)—Prairies, fields, and waste ground, Arkansas and Louisiana to Arizona; introduced in North Carolina and South Carolina; Mexico.

FIGURE 1477.—Distribution of *Panicum arizonicum*.

116. Panicum adspérsum Trin. (Fig. 1475.) Culms ascending or spreading from a decumbent base, rooting at the lower nodes, 30 to 100 cm tall; blades 5 to 15 cm long, 8 to 20 mm wide; panicle 6 to 15 cm long, the racemes 3 to 10 cm long; spikelets 3.2 to 4 mm long, fusiform, abruptly acuminate, hispid or hispidulous, sometimes only at the summit, rarely glabrous, obscurely reticulate-veined. ⊙ —Moist open ground, often on coral limestone, Florida; ballast, Philadelphia and Camden; Mobile; West Indies. The Florida specimens, commonly more robust than the typical form from the West Indies, have been described as *P. keyense* Mez.

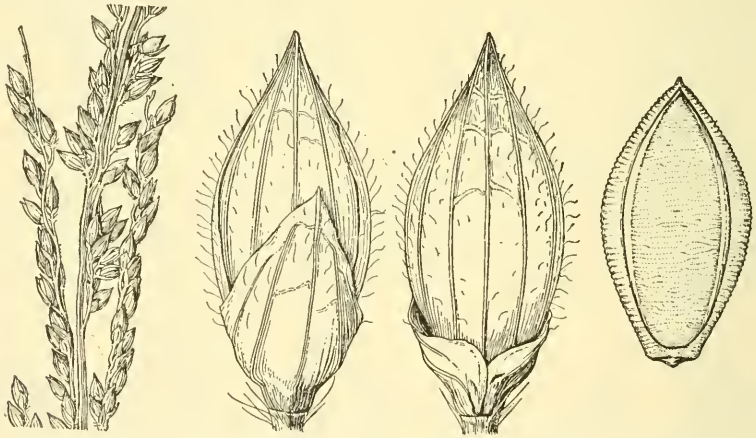

FIGURE 1478.—*Panicum texanum*. Panicle, × 1; two views of spikelet, and floret, × 10. (Hitchcock 3187, Tex.)

Panicum ramósum L. Resembling *P. adspersum*, but spikelets smaller, having a finely transverse rugose sterile lemma, in appearance much like the fertile lemma. ⊙ —Ballast, Alabama (Mobile); tropical Asia.

117. Panicum arizónicum Scribn. and Merr. ARIZONA PANICUM. (Fig. 1476.) Culms erect or sometimes decumbent at base, 20 to 60 cm tall; sheaths glabrous to papillose-hispid; blades 5 to 15 cm long, 6 to 12 mm wide, glabrous or papillose-hispid beneath, ciliate near base; panicle 7 to 20 cm long, the branches rather loosely flowered, finely pubescent and papillose-hirsute; spikelets 3.5 to 3.8 mm long,

obovate-elliptic, densely hirsute to glabrous. ⊙ —Open sandy or stony ground, or in cultivated soil, western Texas to southern California; introduced in North Carolina, South Carolina, Florida, and Mississippi; Mexico (fig. 1477).

118. Panicum texánum Buckl. TEXAS MILLET. (Fig. 1478.) Culms erect or ascending, often decumbent and rooting at the lower nodes, 50 to 150 cm or even to 3 m long, softly pubescent at least below the nodes and below the panicles; sheaths softly pubescent, often papillose; blades 8 to 20 cm long, 7 to 15 mm wide, softly pubescent; panicle 8 to 20 cm long, the branches short, appressed, loosely flowered, the axis and rachises pubescent, with long hairs intermixed; spikelets 5 to 6 mm long, fusiform, pilose, often obscurely reticulate. ⊙ —Prairies and open ground, especially on low land along streams, often a weed in fields, Texas; introduced at several localities, North Carolina to Florida and Oklahoma; Arizona; northern Mexico (fig. 1479).

FIGURE 1479.—Distribution of *Panicum texanum*.

4. Dichotomiflóra.—Somewhat succulent branching annuals; blades flat, panicles many-flowered, the branchlets short and appressed along the rather stiff main branches; spikelets short-pediceled, 7-nerved, glabrous; first glume short, broad; fruit smooth and shining.

119. Panicum dichotomiflórum Michx. FALL PANICUM. (Fig. 1480.) Culms ascending or spreading from a geniculate base, 50 to

FIGURE 1480.—*Panicum dichotomiflorum*. Panicle, × 1; two views of spikelet, and floret, × 10. (Deam, Ind.)

100 cm long, or in robust specimens as much as 2 m long; ligule a dense ring of white hairs 1 to 2 mm long; blades sometimes sparsely pilose on the upper surface, 10 to 50 cm long, 3 to 20 mm wide, the white midrib usually prominent; panicles terminal and axillary, mostly included at base, 10 to 40 cm long or more, the main branches ascending; spikelets narrowly oblong-ovate, usually about 2.5 mm long, acute. ⊙ Moist ground, along streams, and a weed in waste places and cultivated soil, Maine to Nebraska, south to Florida and Texas, occasionally introduced further west; here and there in the West Indies (fig. 1481). PANICUM DICHOTOMIFLORUM var. PURITANÓRUM Svenson. Differing in the shorter, more slender culms and

looser panicles, and in the rather less pointed spikelets about 2 mm long. Intergrades with the species. ⊙ —Wet sandy or boggy shores of ponds, Massachusetts, Connecticut, Long Island; Indiana.

120. Panicum bartowénse Scribn. and Merr. (Fig. 1482). Resembling *P. dichotomiflorum*, mostly larger; culms erect, simple or sparingly branched as much as 2 m tall and 7 mm thick; sheaths papillose-hispid; ligule 2 to 3 mm long. ⊙ —Low ground often in shallow water, Florida; Bahamas.

FIGURE 1481.—Distribution of *Panicum dichotomiflorum.*

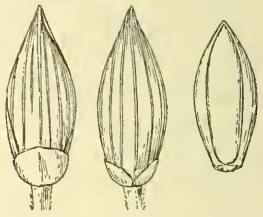

FIGURE 1482.—*Panicum bartowense.* Two views of spikelet, and floret, × 10. (Type.)

5. Capillária.—Branching annuals, papillose-hispid at least on the sheaths; ligules 1 to 3 mm long; panicles many-flowered, mostly diffuse; spikelets pointed, 7- to 9-nerved, glabrous; first glume large, clasping; fruit smooth and shining, usually olive-brown at maturity.

121. Panicum flexile (Gattinger) Scribn. (Fig. 1483.) Culms slender, erect, much branched from the base, 20 to 70 cm tall, somewhat hispid below, the nodes pubescent; blades erect but not stiff, glabrous or sparsely hispid, as much as 30 cm long, 2 to 6 mm wide; panicles relatively few-flowered, oblong, narrow, 10 to 20 cm long about one-third as wide; spikelets 3.1 to 3.5 mm long. ⊙ —Sandy, mostly damp soil, meadows and open woods, New York and Quebec to South Dakota, south to Florida and Texas; introduced in Utah (fig. 1484).

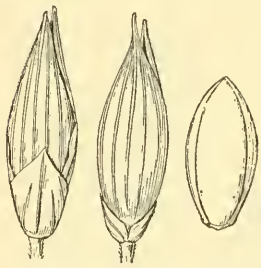

FIGURE 1483.—*Panicum flexile.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1484.—Distribution of *Panicum flexile.*

122. Panicum gattingéri Nash. (Fig. 1485.) Culms at first erect, soon decumbent and rooting at the lower nodes, papillose-hispid, in robust specimens as much as 1 m long; blades 6 to 10 mm wide, more or less hispid or nearly glabrous; panicles numerous, terminal and axillary, oval or elliptic in outline, the terminal 10 to 15 cm long, the lateral smaller; spikelets 2 mm long. ⊙ —Open ground and waste places, often a weed in cultivated soil, New York and Ontario to Minnesota, south to North Carolina and Tennessee (fig. 1486).

123. Panicum philadélphicum Bernh. (Fig. 1487.) Plants light yellowish green; culms slender, usually erect, 15 to 50 cm tall, papillose-hispid to nearly glabrous, more or less zigzag at base; blades usually erect, 5 to 15 cm long, 2 to 6 mm wide, rather sparsely hirsute; panicles 10 to 20 cm long, few-flowered, the branches solitary, rather stiffly ascending, the axillary pulvini hispid; spikelets 1.7 to 2 mm long, mostly in twos at the ends of the branchlets. ⊙ —Dry open or

sandy ground, Connecticut to Wisconsin, south to Georgia and Texas (fig. 1488).

124. Panicum tuckermáni Fernald. (Fig. 1489.) Resembling *P. philadelphicum* and intergrading with it; often spreading or prostrate and much branched at base; panicles more densely flowered, the branches more spreading, the axillary pulvini glabrous; spikelets somewhat racemosely arranged, rather than in twos at the end. ⊙ —Sandy or gravelly shores and open ground, Maine and Quebec to Connecticut and New York; Indiana, Wisconsin (fig. 1490).

125. Panicum capilláre L. WITCHGRASS. (Fig. 1491.) Culms erect or somewhat spreading at base, 20 to 80 cm tall, papillose-hispid

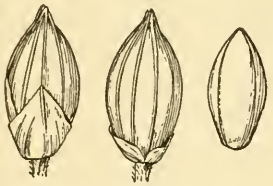

FIGURE 1485.—*Panicum gattingeri.* Two views of spikelet, and floret. × 10. (Type.)

FIGURE 1486.—Distribution of *Panicum gattingeri.*

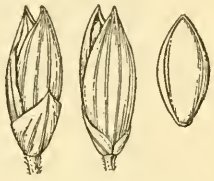

FIGURE 1487.—*Panicum philadelphicum.* Two views of spikelet, and floret, × 10. (Type coll.)

to nearly glabrous; blades 10 to 25 cm long, 5 to 15 mm wide, hispid on both surfaces; panicles densely flowered, very diffuse, often half the length of the entire plant, included at the base until maturity, the branches finally divaricately spreading, the whole panicle breaking away and rolling before the wind; spikelets 2 to 2.5 mm long. ⊙ —Open ground, fields and waste places, Maine to Montana, south to Florida and Texas, and occasionally west of this.

PANICUM CAPILLARE var. OCCIDENTÁLE Rydb. Blades shorter, less pubescent, crowded toward the base, panicles more exserted and divaricate; spikelets usually about 3 mm long (2.5 to 3.3 mm),

FIGURE 1488.—Distribution of *Panicum philadelphicum.*

FIGURE 1489.—*Panicum tuckermani.* Two views of spikelet, and floret, × 10. (Type coll.)

FIGURE 1490.—Distribution of *Panicum tuckermani.*

attenuate at tip; fruit 1.7 to 1.8 mm long. ⊙ (*P. barbipulvinatum* Nash.)—Open ground and waste places, Prince Edward Island and Quebec to British Columbia, south to New Jersey, Missouri, Texas, and California, more common westward.

126. Panicum hillmáni Chase. (Fig. 1492.) Resembling *P. capillare*, especially the var. *occidentale*, differing from this in having no short flowering branches at the base, in the stouter culms, firmer foliage, stiffer panicle branches with the lateral spikelets on shorter more appressed pedicels, in the well-developed sterile palea, and especially in the larger darker fruit (2 mm long) with a prominent lunate scar at the base. ⊙ —Prairies and plains, Kansas to Texas.

FIGURE 1491.—*Panicum capillare.* Plant, × ½; two views of spikelet, and floret, × 10. (V. H. Chase 774, Ill.)

127. Panicum hirticaûle Presl. (Fig. 1493.) Culms usually simple or nearly so, 15 to 70 cm tall, papillose-hispid to nearly glabrous; blades 5 to 15 cm long, 4 to 13 mm wide, often cordate at base, sparsely hispid or nearly glabrous, ciliate toward base; panicles 5 to 15 cm long, scarcely one-third the entire height of the plant; spikelets 2.7 to 3.3 mm long, lanceolate-fusiform, acuminate, usually

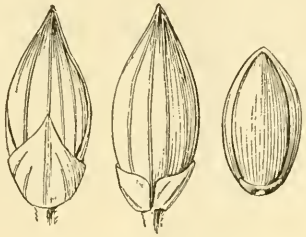

FIGURE 1492.—*Panicum hillmani.* Two views of spikelet, and floret, × 10. (Type.)

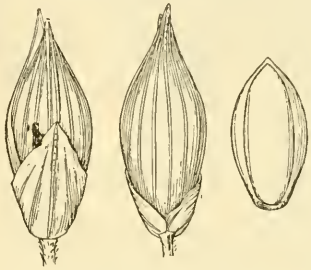

FIGURE 1493.—*Panicum hirticaule.* Two views of spikelet, and floret, × 10. (Type.)

reddish brown; first glume half to three-fourths the length of the spikelet; fruit 2 mm long. ⊙ —Rocky or sandy soil, Arkansas and western Texas to southern California; Mexico to Colombia (fig. 1494).

128. Panicum pampinósum Hitchc. and Chase. (Fig. 1495.) Resembling *P. hirticaule*, but freely branching; spikelets very turgid, about 4 mm long; first glume more than three-fourths the length of the spikelet; fruit 2.2 mm long. ⊙ —Mesas, New Mexico and Arizona; Mexico.

129. Panicum stramíneum Hitchc. and Chase. (Fig. 1496.) Resembling *P. hirticaule*, but freely branching and nearly glabrous throughout; blades longer; spikelets more turgid, less pointed, 3.2 to 3.7 mm long, the first glume about one-third the length of the spikelet; fruit 2.2 mm long, with a prominent lunate scar at base. ⊙ —Rich bottom lands and damp soil, southern Arizona; northwestern Mexico.

FIGURE 1494.—Distribution of *Panicum hirticaule.*

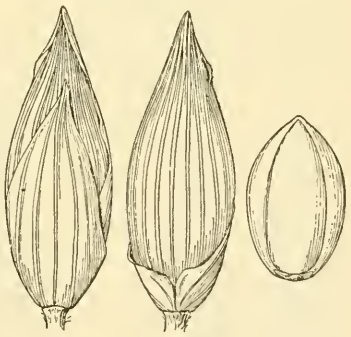

FIGURE 1495.—*Panicum pampinosum.* Two views of spikelet, and floret, × 10. (Type.)

130. Panicum miliáceum L. BROOMCORN MILLET. (Fig. 1497.) Culms stout, erect or decumbent at base, 20 to 100 cm tall; blades more or less pilose on both surfaces or glabrate, as much as 30 cm long and 2 cm wide, rounded at base; panicles usually more or less included at base, 10 to 30 cm long, usually nodding, rather compact, the numerous branches ascending, very scabrous, spikelet-bearing toward the ends; spikelets 4.5 to 5 mm long, ovate, acuminate, strongly many-nerved; fruit 3 mm long, stramineous to reddish

brown. ⊙ —Waste places, introduced or escaped from cultivation, Northeastern States and occasional in other parts of the United States (fig. 1498); temperate parts of the Old World. Broomcorn millet is cultivated in the cooler parts of the United States to a limited extent for forage and occasionally the seed is used for feed for hogs, hence it is sometimes known as hog millet. Also called proso. Commonly cultivated in Europe and western Asia.

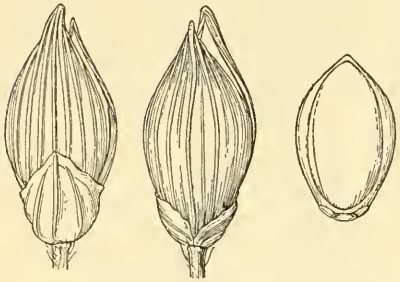

FIGURE 1496.—*Panicum stramineum.* Two views of spikelet, and floret, × 10. (Type.)

6. Diffúsa.—Perennials; culms stiff, mostly tufted; sheaths mostly hirsute; ligules membranaceous, ciliate; spikelets pointed, 7- to 9-nerved, glabrous; fruit smooth and shining.

131. Panicum capillarioídes Vasey. (Fig. 1499.) Culms erect or ascending from a knotted crown, 30 to 55 cm tall, appressed-pubescent or glabrate, the nodes densely ascending-pubescent; blades rather stiff, 10 to 30 cm long, 2 to 10 mm wide, flat, harshly papillose-pubescent; panicle diffuse, few-flowered, 10 to 20 cm long, the capillary branches stiffly spreading at maturity; spikelets 5 to 6 cm long, lanceolate, long-acuminate, fruit 1.6 to 1.8 mm long. 2↓—Prairies and plains, Texas and northern Mexico.

FIGURE 1498.—Distribution of *Panicum miliaceum.*

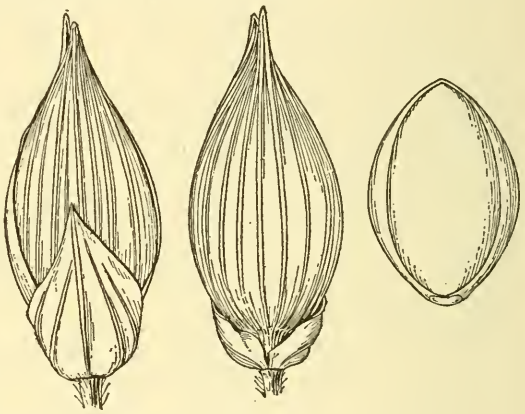

FIGURE 1497.—*Panicum miliaceum.* Two views of spikelet, and floret, × 10. (Griffith 6490, India.)

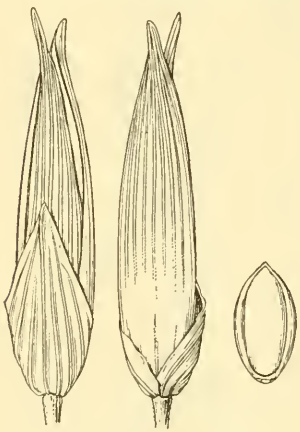

FIGURE 1499.—*Panicum capillarioides.* Two views of spikelet, and floret, × 10. (Type.)

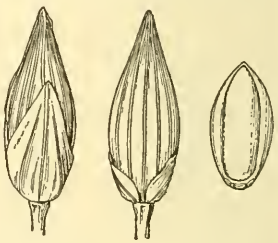

FIGURE 1500.—*Panicum filipes* Two views of spikelet, and floret, × 10. (Type.)

Panicum bérgii Arech. Tufted, with numerous leaves clustered at base; sheaths hispid; blades involute; panicle very diffuse, a third or more the entire height of the plant, the lower branches verticillate, conspicuously pilose in the axils; spikelets

short-pointed, 2.2 to 2.6 mm long. ♃ —Ballast at Mobile, Ala., and at a few points in southeastern Texas. Adventive from South America.

132. Panicum fílipes Scribn. (Fig. 1500.) Culms 30 to 80 cm tall, erect or ascending; blades laxly ascending or spreading, 10 to 25 cm long, 3 to 8 mm wide, flat, glaucous, glabrous or sometimes sparsely hirsute beneath; panicles 7 to 25 cm long, usually equaled or exceeded by the upper blades, the distant branches spreading; spikelets 2 to 2.6 mm long. ♃ —Low open ground or among chaparral, Louisiana (Shreveport) and Texas; northeastern Mexico. Distinguished from *P. hallii* by the longer blades, looser panicle, and smaller spikelets.

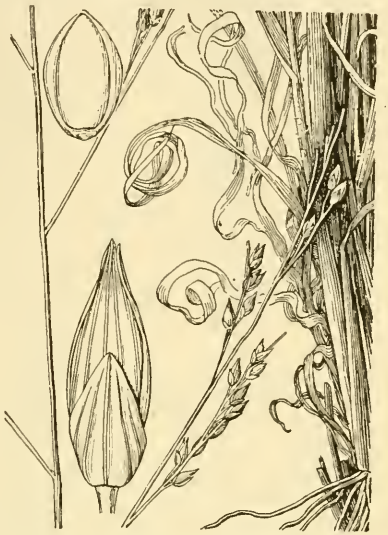

FIGURE 1501.—*Panicum hallii*. Plant, ×1; two views of spikelet, and floret, × 10. (Type.)

133. Panicum hállii Vasey. HALL'S PANICUM. (Fig. 1501.) Somewhat glaucous green, leaves usually crowded toward the base, the blades curling like shavings with age; culms erect, 15 to 60 cm tall; sheaths sparsely papillose-hispid to glabrous; blades erect or nearly so, flat, 4 to 15 cm long, 2 to 6 mm wide, sparsely ciliate toward base, otherwise glabrous or nearly so; panicle 6 to 20 cm long, the few branches stiffly ascending; spikelets 3 to 3.7 mm long. ♃ —Dry prairie, rocky and gravelly hills and canyons, and in bottom lands and irrigated fields, Texas to Arizona; Mexico.

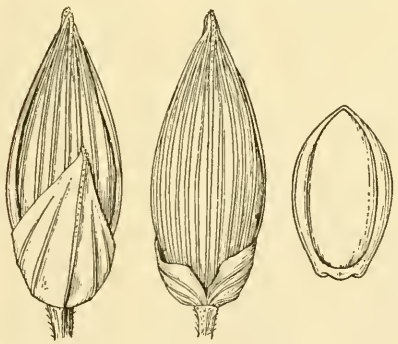

FIGURE 1502.—*Panicum lepidulum*. Two views of spikelet, and floret, × 10. (Type.)

134. Panicum lepídulum Hitchc. and Chase. (Fig. 1502.) Culms 25 to 70 cm tall, erect, usually sparingly branching from lower nodes, sparsely pilose to scabrous; blades suberect, 7 to 30 cm long, 5 to 10 mm wide, sparsely papillose-pilose to nearly glabrous; panicle 7 to 20 cm long, usually scarcely half as wide, branches ascending with short spreading branchlets with 1 to 3 spikelets; spikelets 4 to 4.2 mm long, turgid. ♃ —Moist places mostly in the uplands, New Mexico, Arizona, and Mexico.

135. Panicum ghiesbréghtii Fourn. (Fig. 1503.) Culms erect, rather robust, ascending-hirsute, 60 to 80 cm tall, the nodes densely hirsute; blades as much as 60 cm long and 12 mm wide, flat, papillose-hirsute to glabrescent; panicles 20 to 30 cm long, usually less than half as wide, the branches ascending,

naked at base, the branchlets more or less appressed; spikelets 3 mm long, 1 mm wide. 2↓ —Low moist ground, southern Texas; tropical America.

136. Panicum hirsútum Swartz. (Fig. 1504.) Culms robust, erect, as much as 1.5 m tall and 1 cm thick, simple or branched at base only; nodes appressed-pubescent; sheaths papillose-hirsute, the hairs stiff, spreading, fragile, causing mechanical irritation to the skin when handled; blades flat, as much as 60 cm long and 3.5 cm wide, glabrous; panicle 20 to 35 cm long, at first condensed, finally open, the branches ascending; spikelets 2 to 2.2 mm long. 2↓ —Open moist ground, southern Texas; tropical America at low altitudes.

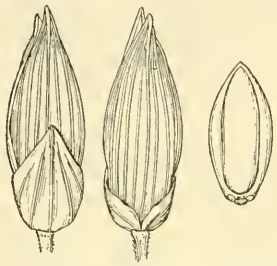

FIGURE 1503.—*Panicum ghiesbreghtii*. Two views of spikelet, and floret, × 10. (Type.)

7. **Máxima.**—Tall robust perennials; ligules membranaceous, ciliate; blades linear, flat; panicles large, many-flowered; spikelets ellipsoid, faintly nerved, glabrous; fruit transversely rugose.

137. Panicum máximum Jacq. GUINEA GRASS. (Fig. 1505.) Plants light green, in large bunches from short stout rhizomes; culms mostly erect, the nodes usually densely hirsute; sheaths papillose-hirsute to glabrous, usually densely pubescent on the collar; ligule 4 to 6 mm long; blades 30 to 75 cm long, as much as 3.5 cm wide, glabrous, very scabrous on the margins, sometimes hirsute on the upper surface near the base; panicles 20 to 50 cm long, about one-third as wide, the long rather stiff branches ascending, naked at base, the lower in whorls, the axils pilose, the branchlets short, appressed, bearing more or less clustered short-pediceled spikelets; spikelets 3 to 3.3 mm long; first glume about one-third the length of the spikelet. 2↓—Fields and waste places, southern Florida, and southern Texas, introduced from Africa; tropical regions of both hemispheres at low altitudes. Guinea grass is the most important cultivated forage grass of tropical America. It grows in moderately dry ground and can be used for pasture or for soiling. Much of the green feed cut for forage is this species.

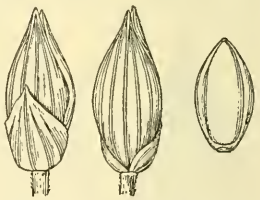

FIGURE 1504.—*Panicum hirsutum*. Two views of spikelet, and floret, × 10. (Type.)

138. Panicum plénum Hitchc. and Chase. (Fig. 1506.) Plants mostly in large clumps, mostly glaucous, from a stout rhizome; culms 1 to 2 m tall, erect from a usually decumbent base, compressed; sheaths glabrous, somewhat keeled; blades 20 to 35 cm long, 7 to 17 mm wide, glabrous or nearly so; panicle 20 to 50 cm long, open; spikelets 3 to 3.4 mm long. 2↓ —Moist places in rocky hills and canyons, Texas to Arizona; Mexico. Differs from *P. bulbosum* in the absence of the basal corm.

139. Panicum bulbósum H.B.K. BULB PANICUM. (Fig. 1507.) Culms in tufts, 1 to 2 m tall, erect, the lowest internode thickened to a hard cormlike base 1 to 2 cm thick, budding at base, some-

FIGURE 1505.—*Panicum maximum*. Plant, × ½; two views of spikelet, and floret, × 10. (Combs and Baker 1170, Fla.)

times with one or more corms of previous years attached; sheaths glabrous, or pilose toward the summit; blades 25 to 60 cm long, 3 to 12 mm wide, scabrous above, glabrous beneath; panicle 20 to 50 cm long, open; spikelets 3.5 to 4.2 mm long. ♃ —Moist places in canyons and valleys, western Texas to Arizona; Mexico (fig. 1508).

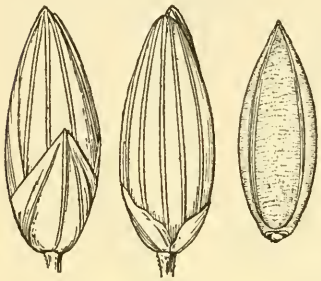

FIGURE 1506.—*Panicum plenum*. Two views of spikelet, and floret, × 10. (Type.)

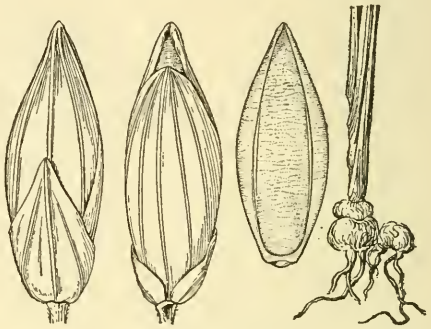

FIGURE 1507.—*Panicum bulbosum*. Base of culm, × ½; two views of spikelet, and floret, × 10. (Lemmon 2914, Ariz.)

PANICUM BULBOSUM var. MÍNUS Vasey. Culms slender, mostly less than 1 m tall, the corms smaller than in the species; blades mostly 2 to 4 mm wide; spikelets 2.8 to 3.2 mm long. ♃ (*P. bulbosum* var. *sciaphilum* Hitchc. and Chase.)—Same range as species and more common with us.

8. Virgáta.—Perennials from stout rhizomes; culms mostly stout; ligules membranaceous, ciliate; blades linear, mostly firm; spikelets turgid, usually gaping, strongly 5- to 9-nerved, glabrous, pointed; lower floret usually staminate; fruit smooth and shining.

140. Panicum répens L. (Fig. 1509.) Culms rigid, 30 to 80 cm tall, erect from the nodes of strong horizontal often extensively creeping rhizomes, clothed at base with bladeless sheaths; sheaths more or less pilose; blades flat or folded, 2 to 5 mm wide, sparsely pilose to glabrous; panicle open, 7 to 12 cm long, the somewhat distant branches stiffly ascending; spikelets 2.2 to 2.5 mm long, ovate; first glume about one-fifth as long as the spikelet, loose, truncate. ♃ —Sea beaches along the Gulf coast, Florida to Texas (fig. 1510); tropical and subtropical coasts of both hemispheres, probably introduced in America.

FIGURE 1508.—Distribution of *Panicum bulbosum*.

141. Panicum gouíni Fourn. (Fig. 1511.) Resembling *P. repens*, but the culms usually less than 30 cm tall; sheaths and blades usually glabrous; panicle smaller, more densely flowered; first glume longer. ♃ —Sea beaches, Alabama to Louisiana; Gulf coast of Mexico.

142. Panicum virgátum L. SWITCHGRASS. (Fig. 1512.) Plants usually in large bunches, green or glaucous, with numerous scaly creeping rhizomes; culms erect, tough and hard, 1 to 2 m tall; sheaths glabrous; blades 10 to 60 cm long, 3 to 15 mm wide, flat, glabrous, or sometimes pilose above near the base, rarely pilose all over; panicle 15 to 50 cm long, open, sometimes diffuse; spikelets 3.5 to 5 mm long,

FIGURE 1509.—*Panicum repens*. Plant, × ½; two views of spikelet, and floret, × 10. (Hitchcock 14145, Hawaii.)

acuminate; first glume clasping, two thirds to three fourths as long as the spikelet, acuminate or cuspidate. 2l —Prairies and open ground, open woods, and brackish marshes, Quebec and Maine to Montana, south to Florida, Nevada, and Arizona; Mexico and Central America. PANICUM VIRGATUM var. CUBÉNSE Griseb. Culms more slender, usually solitary or few in a tuft; panicle narrower with ascending branches; spikelets 2.8 to 3.2 mm long, the second glume and sterile lemma not extending much beyond the fruit. 2l —Pine woods, Coastal Plain, Massachusetts to Florida and Mississippi; Michigan; Cuba. PANICUM VIRGATUM var. SPÍSSUM Linder. Culms from short stout knotty rhizomes. 2l —Nova Scotia to Pennsylvania.

143. Panicum havárdii Vasey. (Fig. 1513.) Pale green, glaucous, glabrous throughout; culms robust, solitary, 1 m tall or more, erect from creeping rhizomes; blades 5 to 10 mm wide, tapering into long involute-setaceous tips; panicle as much as 40 cm long; spikelets 6 to 8 mm long. 2l —Arroyos and sand hills, western Texas and southern New Mexico; northern Mexico.

144. Panicum amárum Ell. (Fig. 1514.) Glaucous and glabrous throughout; culms solitary from the nodes of extensively creeping

FIGURE 1510.—Distribution of *Panicum repens.*

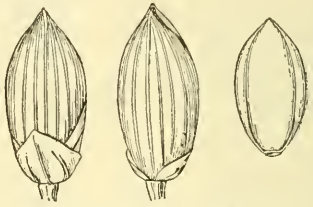

FIGURE 1511.—*Panicum gouini.* Two views of spikelet, and floret, × 10. (Type.)

rhizomes, 30 to 100 cm tall; blades thick, 10 to 30 cm long, 5 to 12 mm wide, flat, involute toward the tip, the margins smooth; panicle one-fourth to one-third the height of the plant, not more than 3 cm wide, the branches appressed; spikelets 5 to 6.5 mm long, acuminate. 2l —Sandy seashores and coast dunes, Connecticut to Georgia; southern Mississippi; Texas (fig. 1515).

145. Panicum amárulum Hitchc. and Chase. (Fig. 1516.) Culms as much as 1 cm thick, in large bunches as much as 1 m across, 1 to 2 m tall, glaucous; rhizomes vertical or ascending; blades 20 to 50 cm long, 5 to 12 mm wide, more or less involute, pilose on the upper surface near the base; panicle large, rather compact, 5 to 10 cm wide, slightly nodding, densely flowered; spikelets 4.3 to 5.5 mm long, acuminate. 2l —Sandy seashores and coast dunes, New Jersey to Virginia; Florida; Louisiana and Texas; Yucatan; Bahamas; Cuba (fig. 1517).

9. Ténera.—Perennials; culms subcompressed, wiry; ligules minute; spikelets short-pediceled; fruit smooth and shining.

146. Panicum ténerum Beyr. (Fig. 1518.) Culms in small tufts from a knotted crown, erect, 40 to 90 cm tall; lower sheaths pubescent toward the summit with spreading hairs; blades 4 to 15 cm long, 2 to 4 mm wide, erect, firm, subinvolute, pilose on upper surface toward base; panicles 3 to 8 cm long, very slender, terminal and axillary; spikelets 2.2 to 2.8 mm long, pointed, glabrous, the pedicel usually

FIGURE 1512.—*Panicum virgatum*. Plant, × ½; two views of spikelet, and floret, × 10. (V. H. Chase, Ill.)

with a few long hairs. 2↓ —Margins of swamps and wet places in pine barrens near the coast, North Carolina to Florida and Texas; West Indies (fig. 1519).

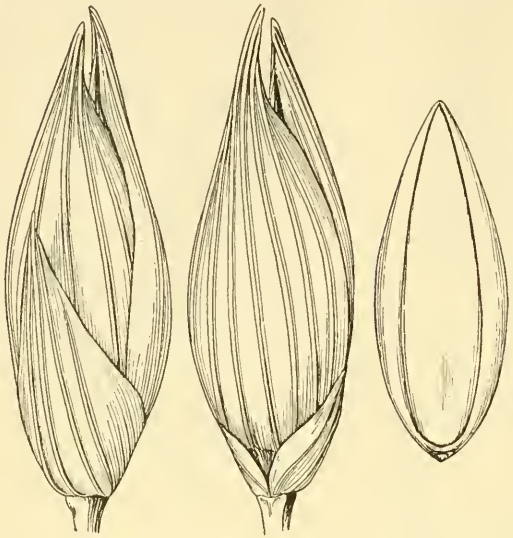

FIGURE 1513.—*Panicum havardii.* Two views of spikelet, and floret, × 10. (Type.)

10. Agrostoídea.—Tufted perennials; culms erect, compressed; sheaths keeled; ligules membranaceous, mostly about 1 mm long; spikelets short-pediceled, lanceolate, pointed, 5- to 7-nerved, glabrous; glumes and sterile lemma mostly keeled; fruit smooth and shining with a minute tuft of thickish hairs at apex.

147. Panicum agrostoídes Spreng. (Fig. 1520.) In dense clumps from a short crown, with numerous short-leaved innovations at base; culms 50 to 100 cm tall; blades erect, folded at base, flat above, 20 to 50 cm long, 5 to 12 mm wide; panicles terminal and axillary, 10 to 30 cm long, half to two-thirds as wide, sometimes more diffuse, the densely flowered branchlets mostly on the under side of the branches, the pedicels usually bearing at the summit one to several delicate hairs; spikelets about 2 mm long. 2↓ —Wet meadows and shores, Maine to Kansas, south to Florida and Texas; Vancouver Island; California (fig. 1521).

FIGURE 1515.—Distribution of *Panicum amarum.*

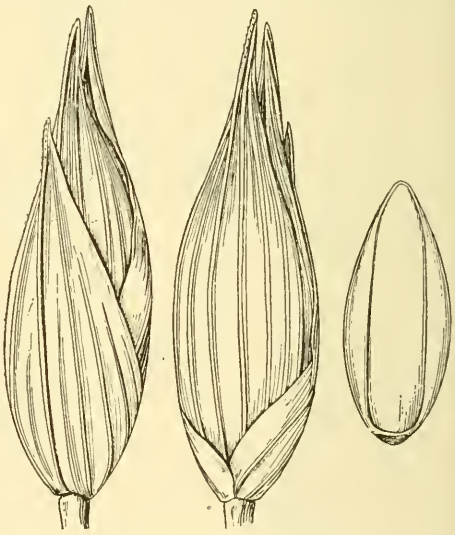

FIGURE 1514.—*Panicum amarum.* Two views of spikelet, and floret, × 10. (Vasey, Va.)

148. Panicum condénsum Nash. (Fig. 1522.) Resembling *P. agrostoides;* culms on the average taller; blades often sparsely pilose

on the upper side at the folded base; panicles 10 to 25 cm long, rarely more than 5 cm wide, the long branches erect, naked at base, with appressed branchlets bearing crowded spikelets, the pedicels not pilose; spikelets 2.2 to 2.5 mm long. 2l —Borders of streams and ponds and in wet places, Coastal Plain, Pennsylvania to Florida and Texas; West Indies (fig. 1523).

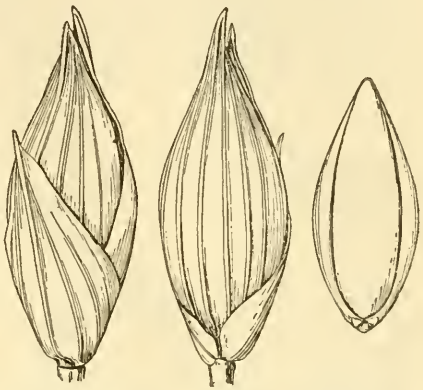

FIGURE 1516.—*Panicum amarulum.* Two views of spikelet, and floret, × 10. (Type.)

149. Panicum stipitátum Nash. (Fig. 1524.) Resembling *P. agrostoides;* often purple tinged throughout, especially the panicles; sheaths much overlapping, the blades usually equaling or exceeding the terminal panicle; panicles usually several to a culm, 10 to 20 cm long, narrow, densely flowered, the numerous stiff branches ascending, with numerous divaricate branchlets, mostly on the lower side; spikelets 2.5 to 2.8 mm long, often curved at the tip. 2l —Moist soil, Connecticut to Missouri, south to Georgia and Texas (fig. 1525).

150. Panicum longifólium Torr. (Fig. 1526.) Culms rather slender, 35 to 80 cm tall, in dense tufts, usually surrounded by basal leaves nearly half as long; sheaths usually villous near the summit; ligule fimbriate-ciliate, 2 to 3 mm long; blades elongate, 2 to 5 mm wide, pilose on the upper surface near the base; lateral panicles few or none, the terminal 10 to 25 cm long, the branches slender, ascending; spikelets 2.4 to 2.7 mm long. 2l —Moist sandy ground, Coastal Plain, Massachusetts to Florida and Texas (fig. 1527).

FIGURE 1517.—Distribution of *Panicum amarulum.*

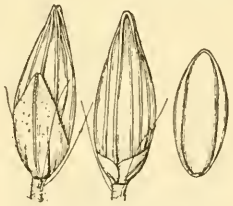

FIGURE 1518.—*Panicum tenerum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1519.—Distribution of *Panicum tenerum.*

151. Panicum cómbsii Scribn. and Ball. (Fig. 1528.) Resembling *P. longifolium;* sheaths glabrous or nearly so; ligule less than 1 mm long; blades on the average shorter; spikelets 3 to 3.5 mm long, acuminate. 2l —Margins of ponds and wet woods, Georgia to Florida and Louisiana (fig. 1529).

152. Panicum ánceps Michx. (Fig. 1530.) Culms 50 to 100 cm tall, with numerous scaly rhizomes; sheaths glabrous or pilose; blades elongate, 4 to 12 mm wide, pilose above near the base; panicles 15

to 40 cm long, the slender, remote branches somewhat spreading, bearing short mostly appressed branchlets with rather crowded somewhat curved subsecund spikelets, set obliquely on their pedicels; spikelets 3.4 to 3.8 mm long. ♃ —Moist sandy soil, New Jersey to Kansas, south to Florida and Texas (fig. 1531).

153. Panicum rhizomátum Hitchc. and Chase. (Fig. 1532.) Resembling *P. anceps*; culms less robust, the rhizomes more slender and numerous; sheaths densely to sparsely villous, especially at the summit; blades usually pubescent on both surfaces; panicles more or less contracted; spikelets 2.4 to 2.8 mm long. ♃ —Moist sandy woods and savannas, Coastal Plain, Maryland to Florida and Texas (fig. 1533).

FIGURE 1520.—*Panicum agrostoides*. Panicle, × 1; two views of spikelet, and floret, × 10. (Fisher 30, N.J.)

11. **Láxa.**—Slender perennials; culms compressed; ligules minute; spikelets short-pediceled, 5-nerved, glabrous, the palea of the sterile floret becoming enlarged and indurate, expanding the spikelet at maturity; fruit minutely papillose-roughened, relatively thin in texture.

154. Panicum híans Ell. (Fig. 1534.) Culms 20 to 60 cm tall, mostly erect, sometimes more or less decumbent, or prostrate with erect branches; blades 5 to 15 cm long, 1 to 5 mm wide, flat or folded, pilose on the upper surface near base; panicles 5 to 20 cm long, usually loose and open, the primary branches few, slender, distant, spreading or drooping, the branchlets borne on the upper half or towards the ends only; spikelets in more or less secund clusters, 2.2 to 2.4 mm long, at maturity about twice as thick as wide. ♃ —Damp soil

FIGURE 1521.—Distribution of *Panicum agrostoides*.

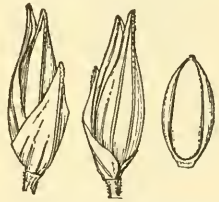

FIGURE 1522.—*Panicum condensum*. Two views of spikelet, and floret × 10. (Type.)

FIGURE 1523.—Distribution of *Panicum condensum*.

along ponds and streams, North Carolina to Florida and Texas, thence north to Oklahoma and southern Missouri; Mexico (fig. 1535).

12. **Verrucósa.**—Glabrous branching annuals; culms slender, weak, decumbent at base, usually with stilt-roots; ligules minute; panicles with divaricate capillary branches, spikelet-bearing toward the ends, the spikelets mostly in twos; spikelets tuberculate, nerves obscure or obsolete; first glume minute; fruit minutely papillose, margin of the lemma inrolled only at base.

155. Panicum verrucósum Muhl. (Fig. 1536.) Bright green, at first erect, later widely spreading; culms 20 to 150 cm long; blades thin, flat, lax, 5 to 20 cm long, 4 to 10 mm wide; panicles 5 to 30 cm

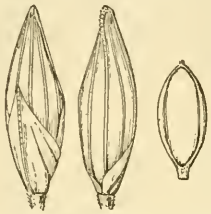

FIGURE 1524.—*Panicum stipitatum.* Two views of spikelet, and floret, × 10. (Commons 305, Del.)

FIGURE 1525.—Distribution of *Panicum stipitatum.*

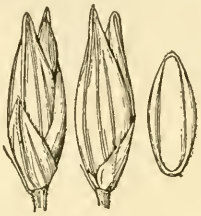

FIGURE 1526.—*Panicum longifolium.* Two views of spikelet, and floret, × 10. (Type.)

long, about as wide, diffuse, small panicles often produced at the lower nodes; spikelets 1.8 to 2.1 mm long, elliptic-obovate, subacute, roughened with small warts. ⊙ —Wet, mostly shady soil, Massachusetts to Florida, west to Michigan, Tennessee, and Texas (fig. 1537).

FIGURE 1527.—Distribution of *Panicum longifolium.*

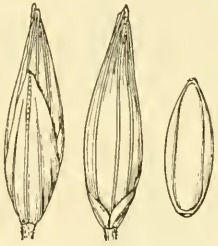

FIGURE 1528.—*Panicum combsii.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1529.—Distribution of *Panicum combsii.*

156. Panicum brachyánthum Steud. (Fig. 1538.) Culms 30 to 100 cm tall; blades 5 to 15 cm long, 2 to 3 mm wide; panicles 5 to 15

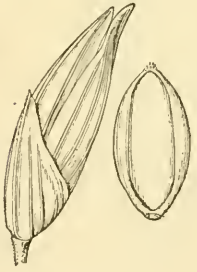

FIGURE 1530.—*Panicum anceps.* Spikelet and floret, × 10. (Type.)

FIGURE 1531.—Distribution of *Panicum anceps.*

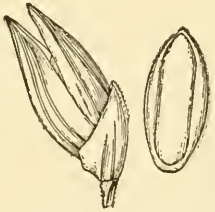

FIGURE 1532.—*Panicum rhizomatum.* Spikelet and floret, × 10. (Type.)

cm long, the branches few; spikelets 3.2 to 3.6 mm long, fusiform, acute, tuberculate-hispid. ⊙ —Sandy soil, Louisiana, Texas, and Oklahoma.

13. Urvilleána.—Robust perennials; spikelets large, densely villous; fertile lemma long-villous on the margin.

157. Panicum urvilleánum Kunth. (Fig. 1539.) Culms solitary or few in a tuft, 50 to 100 cm tall, erect from a creeping rhizome; nodes densely bearded; sheaths overlapping, densely retrorse-villous; blades elongate, 4 to 7 mm wide, tapering from a flat base to a long involute setaceous point, strigose or glabrous; panicle 25 to 30 cm long, the slender branches ascending; spikelets 6 to 7 mm long, densely silvery- or tawny-villous; first glume clasping, from two-thirds

FIGURE 1533.—Distribution of *Panicum rhizomatum.*

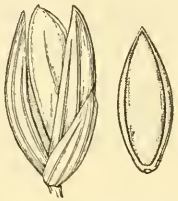

FIGURE 1534.—*Panicum hians.* Spikelet and floret, × 10. (Type.)

FIGURE 1535.—Distribution of *Panicum hians.*

to nearly as long as the spikelet. 2↓ —Sandy deserts, Arizona and southern California; Argentina, Chile.

14. Obtúsa.—Stoloniferous wiry perennial; ligules about 1 mm long; panicles narrow, the few appressed branches densely flowered; spikelets short-pediceled, secund, glabrous; fruit smooth and shining.

158. Panicum obtúsum H. B. K. VINE-MESQUITE. (Fig. 1540.) Tufted from a knotted crown, the stolons sometimes 2 m long or more, with long internodes and geniculate, swollen, conspicuously villous nodes; culms compressed, 20 to 80 cm tall; blades mostly elongate, 2 to 7 mm wide, glabrous or nearly so; panicles 3 to 12 cm

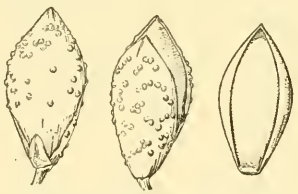

FIGURE 1536.—*Panicum verrucosum.* Two views of spikelet, and floret, × 10. (Type.)

FIGURE 1537.—Distribution of *Panicum verrucosum.*

long, about 1 cm wide; spikelets 3 to 3.8 mm long, obovoid, brownish, obtuse; first glume nearly as long as the spikelet. 2↓ —Sandy or gravelly soil, mostly along banks of rivers, arroyos, and irrigation ditches, western Missouri to Colorado, south to Texas and Arizona; Mexico (fig. 1541).

15. Hemítoma.—Aquatic or subaquatic perennial; panicles elongate, very narrow; spikelets subsessile, 3- to 5-nerved, glabrous.

159. Panicum hemítomon Schult. MAIDENCANE. (Fig. 1542.) With extensively creeping rhizomes, often producing numerous sterile shoots with overlapping sometimes densely hirsute sheaths; culms 50 to 150 cm tall, usually hard; sheaths of fertile culms usually glabrous; blades 10 to 25 cm long, 7 to 15 mm wide, usually scabrous on the upper surface and smooth beneath; panicle 15 to 30 cm long, the

branches erect, the lower distant, the upper approximate, 2 to 10 cm long; spikelets 2.4 to 2.7 mm long, lanceolate, acute; first glume about half the length of the spikelet; fruit less rigid than usual in the genus, the apex of the palea scarcely enclosed. ♃ —Moist soil along river banks and ditches, borders of lakes and ponds, often in

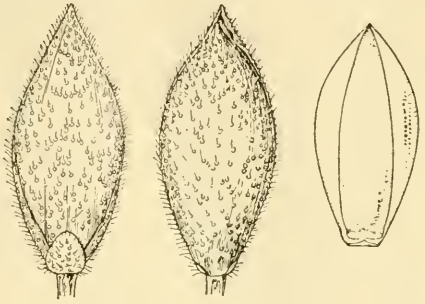

FIGURE 1538.—*Panicum brachyanthum.* Two views of spikelet, and floret, × 10. (Type.)

the water, sometimes a weed in moist cultivated fields, Coastal Plain, New Jersey to Florida and Texas; Brazil (fig. 1543).

16. Gymnocárpa.—Succulent glabrous perennial; panicles of several to many long stiffly ascending racemes along a main axis; spikelets strongly 3- to 5-nerved, glabrous.

160. Panicum gymnocárpon Ell. (Fig. 1544.) Creeping, the base as much as 2 m long, rooting at the nodes; culms 60 to 100 cm tall;

FIGURE 1539.—*Panicum urvilleanum.* Two views of spikelet, and floret, × 10. (Type.)

blades elongate, 15 to 25 mm wide, flat, scarcely narrowed at the cordate, sparingly ciliate base, the margin very scabrous; panicle 20 to 40 cm long; spikelets 6 to 7 mm long; first glume nearly as long as the sterile lemma, the second glume exceeding the sterile lemma, all acuminate-pointed, much exceeding the obovate, stipitate fruit, this 2 mm long, smooth and shining. ♃ —Ditches and muddy banks of streams and lakes, Georgia and Florida to Texas (fig. 1545).

FIGURE 1540.—*Panicum obtusum*. Plant, × ½; spikelet and floret, × 10. (Hitchcock 13412, Tex.)

130. LASÍACIS (Griseb.) Hitchc.

Spikelets subglobose, placed obliquely on their pedicels; first glume broad, somewhat inflated-ventricose, usually not more than one-third the length of the spikelet, several-nerved; second glume and sterile lemma about equal, broad, abruptly apiculate, papery-chartaceous, shining, many-nerved, glabrous, or lanose at the apex only, the lemma enclosing a membranaceous palea and sometimes a staminate flower; fertile lemma white, bony-indurate, obovoid, obtuse, this and the palea of the same texture, bearing at the apex in a slight depression a tuft of woolly hairs, the palea concave below, gibbous above, the apex often free at maturity. Large branching perennials, with woody culms often clambering several meters high into shrubs or trees, the blades firm, flat, usually lanceolate and narrowed into a petiole, the spikelets in an open panicle. Type species, *Lasiacis divaricata*. Name from Greek *lasios*, woolly, and *akis*, point, alluding to the tuft of wool at the tip of the fruit.

FIGURE 1541.—Distribution of *Panicum obtusum*.

FIGURE 1543.—Distribution of *Panicum hemitomon*.

FIGURE 1542.—*Panicum hemitomon*. Panicle, × 1; spikelet and floret, × 10. (Tracy 6731, Fla.)

FIGURE 1544.—*Panicum gymnocarpon*. Panicle, × 1; spikelet and floret, × 10. (Type.)

1. Lasiacis divaricáta (L.) Hitchc. TIBISEE. (Fig. 1546.) Glabrous throughout except the margins of the sheaths; culms much branched, clambering over shrubs to the height of 3 or 4 m, the main culm (cane) strong, as much as 6 mm in diameter, the main branches often fascicled, the vigorous secondary sterile shoots usually strongly divaricate or zigzag; blades narrowly lanceolate, 5 to 20 cm long, 5 to 15 mm wide, or larger on vigorous sterile shoots; panicles terminating

FIGURE 1545.—Distribution of *Panicum gymnocarpon*.

the main culm and branches, 5 to 20 cm long, loosely few-flowered, the branches distant, spreading or reflexed; spikelets ovoid, about

FIGURE 1546.—*Lasiacis divaricata.* Plant, × ½; spikelet and floret, × 10. (Curtiss 5530, Fla.)

4 mm long, black at maturity. ♃ —Copses and edges of woods, southern Florida; tropical America, at low altitudes, especially near the seacoast.

131. SACCIÓLEPIS Nash

Spikelets oblong-conic; first glume much shorter than the spikelet; second glume broad, inflated-saccate, strongly many-nerved; sterile

FIGURE 1547.—*Sacciolepis striata*. Plant, × ½; two views of spikelet, and floret, × 10. (Chase 4240, Fla.)

lemma narrower, flat, fewer nerved, its palea nearly as long, often subtending a staminate flower; fertile lemma stipitate, elliptic, chartaceous-indurate, the margins inrolled, the palea not enclosed at

the summit. Annuals or perennials, of wet soil, usually branching, the inflorescence a dense, usually elongate, spikelike panicle. Type species, *Panicum gibbum* Ell. (*Sacciolepis striata*). Name from Greek *sakkion*, a small bag, and *lepis*, scale, alluding to the saccate second glume.

1. Sacciolepis striáta (L.) Nash. (Fig. 1547.) Perennial, glabrous, often decumbent and rooting at base; culms as much as 1 to 2 m tall; sheaths more or less papillose-hirsute; blades lanceolate, 4 to 20 cm long; panicles 6 to 30 cm long; spikelets about 4 mm long. 2↓ (*Sacciolepis gibba* Nash.)—Marshes, ditches, and wet places, Coastal Plain, New Jersey (Cape May) to Florida, Tennessee, Texas, and Oklahoma; West Indies (fig. 1548).

FIGURE 1548.—Distribution of *Sacciolepis striata*.

Sacciolepis índica (L.) Chase. Annual; culms slender, spreading, 20 to 60 cm tall; blades 2 to 4 mm wide; panicle spikelike, 1 to 4 cm long; spikelets about 2.5 mm long, glabrous. 2↓ —Introduced in a Government pecan orchard, Thomasville, Ga. India.

132. OPLÍSMENUS Beauv.

Spikelets terete or somewhat laterally compressed, subsessile, solitary or in pairs, in two rows crowded or approximate on one side of a narrow scabrous or hairy rachis; glumes about equal, entire, or emarginate, awned from the apex or from between the lobes; sterile lemma exceeding the glumes and fruit, notched or entire, mucronate or short-awned, enclosing a hyaline palea; fertile lemma elliptic, acute, convex or boat-shaped, the firm margins clasping the palea, not inrolled. Freely branching, creeping, shade-loving annuals or perennials, with erect flowering shoots, flat, thin, lanceolate or ovate blades, and several one-sided, thickish, short racemes rather distant on a main axis. Type species, *Oplismenus africanus* Beauv. Name from Greek *hoplismenos*, armed, alluding to the awned spikelets.

1. Oplismenus setárius (Lam.) Roem. and Schult. (Fig. 1549.) Perennial; culms slender, lax, ascending or prostrate, 10 to 20 cm long, sometimes as much as 30 cm; blades ovate to ovate-lanceolate, thin, 1 to 3 cm long, 4 to 10 mm wide; panicle long-exserted, usually not more than 5 cm long; racemes usually 3 to 5, subglobose, distant or the upper approximate, the lower internodes sometimes as much as 2 cm long, the rachis 2 to 3 mm long, sometimes to 6 mm; spikelets about 5 (4 to 8) on each rachis; awn of first glume 4 to 8 mm long. 2↓ —Shaded places along the coast, North Carolina to Florida, Arkansas, and Texas; tropical America at low altitudes (fig. 1550).

An allied species of the American tropics, *Oplismenus hirtellus* (L.) Beauv., basket grass, is cultivated by florists as a basket plant and for edging, under the name *Panicum variegatum*. It has been incorrectly referred to *Oplismenus burmanni* (Retz.) Beauv. The common form in cultivation is variegated, the blades being striped with white.

FIGURE 1550.—Distribution of *Oplismenus setarius*.

FIGURE 1549.—*Oplismenus setarius*. Plant, ×½; two views of spikelet, and floret, × 10. (Curtiss 5553, Fla.)

130. ECHINÓCHLOA Beauv.

Spikelets plano convex, often stiffly hispid, subsessile, solitary or in irregular clusters on one side of the panicle branches; first glume about half the length of the spikelet, pointed; second glume and sterile lemma equal, pointed, mucronate, or the glume short-awned and the lemma long-awned, sometimes conspicuously so, enclosing a membranaceous palea and sometimes a staminate flower; fertile lemma planoconvex, smooth and shining, acuminate-pointed, the margins inrolled below, flat above, the apex of the palea not enclosed. Coarse, often succulent, annuals or perennials, with compressed sheaths, linear flat blades, and rather compact panicles composed of short, densely flowered racemes along a main axis. Our species are annuals without ligules. Type species, *Echinochloa crusgalli*. Name from Greek *echinos*, hedgehog, and *chloa*, grass, alluding to the echinate spikelets.

FIGURE 1551.—*Echinochloa colonum*, × 1. (Bentley, Tex.)

All the species are grazed by stock but usually grow in sparse stands or in situations where they cannot well be utilized. *E. crusgalli* is occasionally cut for hay. *Echinochloa crusgalli* var. *frumentacea*, Japanese millet, has been advertised by seedsmen in this country as billion-dollar grass and recommended for forage. It has some forage value, but requires considerable moisture to produce abundantly, and is rather too succulent for hay. This and forms of *E. colonum* are cultivated in tropical Asia and tropical Africa for the seeds which are used for food.

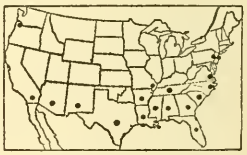

FIGURE 1552.—Distribution of *Echinochloa colonum*.

Racemes simple, rather distant, 1 to 2 cm long; spikelets crowded in about 4 rows, the awn of the sterile lemma reduced to a short point; blades 3 to 6 mm wide ..... 1. E. COLONUM.

Racemes more or less branched, usually more than 2 cm long; spikelets irregularly crowded and fascicled, usually not arranged in rows, the awn of the sterile lemma variable; blades usually more than 5 mm wide.

Sterile floret staminate ..... 4. E. PALUDIGENA.

FIGURE 1553.—*Echinochloa crusgalli*. Plant, × ½; two views of spikelet, and floret, × 10. (Somes 3725, Iowa.)

Sterile floret neuter.
Sheaths smooth; awns variable, but the panicle not a dense mass of long-awned spikelets.
Panicles erect and rather stiff (heavy panicles somewhat nodding); spikelets conspicuously hispid---------- 2. E. CRUSGALLI.
Panicles soft and nodding; spikelets inconspicuously hispid. 3. E. CRUS-PAVONIS.
Sheaths, at least the lower, hispid or scabrous; panicle dense, the spikelets long-awned---------- 5. E. WALTERI.

1. Echinochloa colónum (L.) Link. JUNGLE-RICE. (Fig. 1551.) Culms prostrate to erect, 20 to 40 cm long; blades rather lax, 3 to 6 mm wide, occasionally transversely zoned with purple; panicle 5 to 15 cm long; racemes several, 1 to 2 cm long, appressed or ascending, single or occasionally two approximate, the lower usually distant as much as 1 cm; spikelets about 3 mm long, crowded, nearly sessile; second glume and sterile lemma short-pointed, rather soft, faintly nerved, the nerves weakly hispid-scabrous. ⊙ —Ditches and moist places, Virginia to Missouri, south to Florida, Texas, and southeastern California; ballast, Camden, N.J., Philadelphia, Pa., and Portland, Oreg. (fig. 1552); tropical regions of both hemispheres; introduced in America.

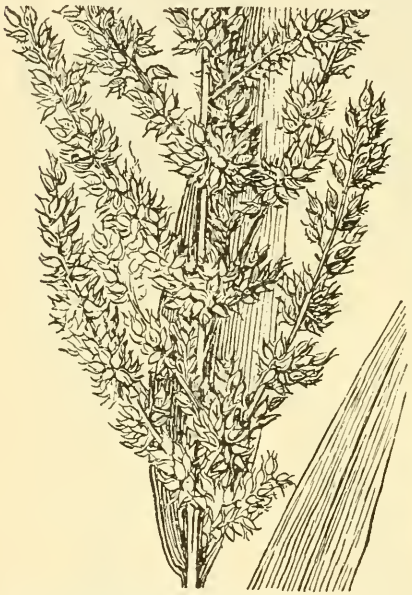

FIGURE 1554.—*Echinochloa crusgalli* var. *mitis*, × 1. (Pammel and Cratty 791, Iowa.)

FIGURE 1555.—*Echinochloa crusgalli* var. *zelayensis*, × 1. (Mearns 744, Mex.)

2. Echinochloa crusgálli (L.) Beauv. BARNYARD GRASS. (Fig. 1553.) Culms erect to decumbent, stout, as much as 1 m or even 1.5 m tall, often branching at base; sheaths glabrous; blades elongate, 5 to 15 mm wide; panicle erect or nodding, purple tinged, 10 to 20 cm long; racemes spreading, ascending or appressed, the lower somewhat distant, as much as 10 cm long, sometimes branched, the

upper approximate; spikelets crowded, about 3 mm long, excluding the awns; internerves hispidulous; nerves strongly tuberculate-hispid; awn variable, mostly 5 to 10 mm long on at least some of the spikelets, sometimes as much as 3 cm. ⊙ —Moist open places, ditches, cultivated fields, and waste ground, New Brunswick to Washington, south to Florida and California, mostly at low and medium altitudes; Eastern Hemisphere. *Echinochloa muricata* (Michx.) Fernald is differentiated by Fernald from *E. crusgalli* by the stiff hairs arising from papillae on the spikelets, true *E. crusgalli* as he understands it having hairs that lack the papillose base. The author has been unable to separate *E. muricata*, the European specimens having on the average as strongly tuberculate spikelets as Michaux's specimen. The three following varieties intergrade and can be only arbitrarily distinguished.

FIGURE 1556.—*Echinochloa crusgalli* var. *frumentacea*, × 1. (Piper, Tex.)

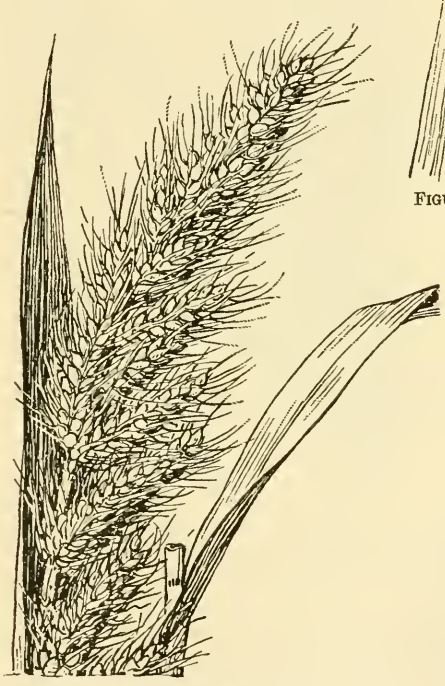

FIGURE 1557.—*Echinochloa crus-pavonis*, × 1. (Sintenis 1889, P.R.)

ECHINOCHLOA CRUSGALLI var. MÍTIS (Pursh) Peterm. (Fig. 1554.) Spikelets awnless or nearly so, the awns less than 3 mm long. ⊙ —Moist places over about the same area as the species and nearly as common.

ECHINOCHLOA CRUSGALLI var. ZELAYÉNSIS (H. B. K.) Hitchc. (Fig. 1555.) Differs from *E. crusgalli* var. *mitis* in having less succulent culms, mostly simple, more or less appressed racemes, the spikelets less strongly hispid but papillose, usually green. Small plants resemble *E. colonum*, but differ in the more distinctly pointed spikelets, more spreading racemes, and erect more robust culms. ⊙ —Moist, often alkaline places, Oklahoma to Oregon, south to Texas and Cali-

fornia; Mexico to Argentina, in the tablelands. (Type from Zelaya, Mexico.)

ECHINOCHLOA CRUSGALLI var. FRUMENTÁCEA. (Roxb.) Wight. JAPANESE MILLET. (Fig. 1556.) Racemes thick, appressed, incurved; spikelets more turgid, awnless, mostly purple. ⊙ (Var. *edulis* Hitchc.)—Occasionally cultivated as a forage grass and escaped here and there. Exploited at one time under the name billion-dollar grass.

3. Echinochloa crus-pavónis (H.B.K.) Schult. (Fig. 1557.) Culms erect or sometimes decumbent at base, as much as 1 m tall; blades 5 to 15 mm wide; panicle 10 to 20 cm long, nodding, rather soft, pinkish or pale purple; racemes mostly ascending or appressed, the lower somewhat distant; spikelets about 3 mm long, hispid on the nerves, hispidulous on the internerves, the awn usually about 1 cm long. ⊙ (*E. crusgalli crus-pavonis* Hitchc.)—Marshes and wet places, often in the water, Alabama, southern Texas, and through tropical America at low altitudes.

FIGURE 1558.—*Echinochloa paludigena*, × 1. (Fredholm 6390, Fla.)

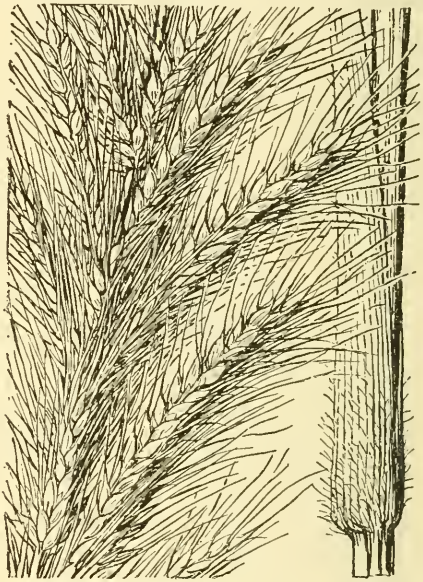

FIGURE 1559.—*Echinochloa walteri*, × 1. (Chase 1426, Ill.)

4. Echinochloa paludígena Wiegand. (Fig. 1558.) Culms mostly solitary, erect, rather stout, usually 1 to 1.5 m tall; blades elongate, 8 to 20 mm wide; panicle narrow, usually 20 to 30 cm long; racemes ascending, usually simple, rather evenly distributed on the axis, not closely crowded, sometimes remote; spikelets about as in *E. crusgalli*, but on the average less strongly tuberculate; sterile floret staminate. ⊙ —Ditches, marshes, and wet places, often in shallow water, south and central Florida.

5. Echinochloa waltéri (Pursh) Heller. (Fig. 1559.) Culms usually stout, erect, 1 to 2 m tall; sheaths papillose-hispid or papillose only, sometimes only the lower sheaths hispid or the hairs on the

margins only; panicle dense, as much as 30 cm long; spikelets somewhat less turgid than in *E. crusgalli*, the awns usually purple, 1 to 2 cm long or sometimes longer. ⊙ —Wet places, often in shallow water, or brackish marshes, Coastal Plain, Massachusetts to Florida and Texas; New York to Wisconsin, Iowa, and Kentucky (fig. 1560). Sheaths rarely glabrous (*E. longearistata* Nash).

134. TRICHOLAÉNA Schrad.

Spikelets on short capillary pedicels; first glume minute, villous; second glume and sterile lemma equal, raised on a stipe above the first glume, emarginate or slightly lobed, short-awned, covered, except toward the apex, with long silky hairs, the palea of the sterile lemma well developed; fertile lemma shorter than the spikelet, cartilaginous, smooth, boat-shaped, obtuse, the margin thin, not inrolled, enclosing the margins of the palea. Perennial or annual grasses, with rather open panicles of silky spikelets. Type species, *Tricholaena micrantha* Schrad. Named from Greek *thrix* (*trich-*) hair, and *chlaina*, cloak, alluding to the silky spikelets.

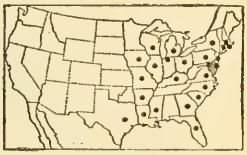

FIGURE 1560.—Distribution of *Echinochloa walteri*.

1. Tricholaena rósea Nees. NATAL GRASS. (Fig. 1561.) Annual; culms slender, about 1 m tall; blades flat, 2 to 5 mm wide; panicle rosy purple, 10 to 15 cm long, the branches slender, ascending; spikelets about 5 mm long, the capillary pedicels flexuous or recurved. ⊙ —Sandy prairies, open woods, fields, and waste places, Florida and Texas; naturalized from South Africa; drier parts of tropical America at low altitudes. Cultivated as a meadow grass in sandy soil in Florida and more rarely along the Gulf coast. Referred by some to *Rhynchelytrum repens* (Willd.) Hubb., a dubious name.

CORIDÓCHLOA Nees

Spikelets flattened, ovate, in 2 or 3's, subsessile along a slender rachis; glumes and sterile lemma papery, the second glume stiffly ciliate; fruit stipitate, awned. Annual, with several digitate racemes naked at base.

Coridóchloa cimicína (L.) Nees. Culms 20 to 60 cm tall; sheaths hispid; blades 3 to 8 cm long, 1.5 to 2.5 cm wide, subcordate; racemes mostly 4 to 8, digitate, sometimes a second whorl below; spikelets about 3 mm long, the awn of the fruit curved, about 1 mm long.—Sparingly introduced in Florida. Southern Asia.

135. SETÁRIA Beauv.

(*Chaetochloa* Scribn.)

Spikelets subtended by one to several bristles (sterile branchlets), falling free from the bristles, awnless; first glume broad, usually less than half the length of the spikelet, 3- to 5-nerved; second glume and sterile lemma equal, or the glume shorter, several-nerved; fertile lemma coriaceous-indurate, smooth or transversely rugose. Annual or perennial grasses, with narrow terminal panicles, these dense and spikelike or somewhat loose and open. Type species, *Setaria viridis*.

FIGURE 1561.—*Tricholaena rosea*. Plant, × ½; spikelet and floret, × 10. (Tracy 9365, Fla.)

Name from Latin *seta*, a bristle, alluding to the numerous bristles of the inflorescence. The species are, in general, palatable and nutritious. A few species, especially *S. macrostachya*, form an appreciable part of the forage on southwestern ranges. Primitive peoples have cultivated *S. italica*, Italian or foxtail millet, since prehistoric times. The seed has been found in early remains such as those of the Swiss lake dwellings of the stone age. In America the species is used for hay. Another species, *S. palmifolia*, is cultivated for ornament in greenhouses.

Bristles below each spikelet numerous, at least more than 5. Panicle dense, cylindric, spikelike.
  Plants annual ..... 1. S. LUTESCENS.
  Plants perennial ..... 2. S. GENICULATA.
Bristles below each spikelet 1, or, by the abortion of the spikelets, 2 or 3.
  Bristles more or less retrorsely scabrous (antrorsely in var. *ambigua*) 3. S. VERTICILLATA.
  Bristles antrorsely scabrous only.
    Plants perennial.
      Spikelets 3 mm long.
        Blades scabrous ..... 4. S. MACROSPERMA.
        Blades villous ..... 5. S. VILLOSISSIMA.
      Spikelets 2 to 2.5 mm long.
        Blades mostly less than 1 cm wide, often folded; panicles usually loosely or interruptedly spikelike, the branches usually not more than 1 cm long ..... 6. S. MACROSTACHYA.
        Blades flat, as much as 1.5 cm wide; panicles tapering from near the base, the lower branches as much as 3 cm long ..... 7. S. SCHEELEI.
    Plants annual.
      Fertile lemma coarsely transversely rugose.
        Panicle densely cylindric ..... 8. S. CORRUGATA.
        Panicle loosely flowered ..... 9. S. LIEBMANNI.
      Fertile lemma finely cross-lined or nearly smooth.
        Panicle loosely flowered, tapering above ..... 10. S. GRISEBACHII.
        Panicle compactly flowered, sometimes interrupted at base.
          Culms as much as 3 m tall. Bristles 1 to 2 cm long; fertile lemma smooth or nearly so ..... 11. S. MAGNA.
          Culms mostly less than 1 m tall.
            Panicle cylindric, tapering above, green; spikelets falling entire. 12. S. VIRIDIS.
            Panicle lobed or interrupted, often large and heavy, purple or yellow; fruit deciduous from glumes and sterile lemma. 13. S. ITALICA.

1. Setaria lutéscens (Weigel) F. T. Hubb. YELLOW BRISTLEGRASS. (Fig. 1562.) Annual, branching at base; culms erect to prostrate, mostly 50 to 100 cm tall, compressed; sheaths keeled; blades as much as 25 cm long and 1 cm wide, flat, twisted in a loose spiral, villous toward the base above; panicle dense, evenly cylindric, spikelike, yellow at maturity, mostly 5 to 10 cm long, about 1 cm thick, the axis densely pubescent; bristles 5 to 20 in a cluster, the longer 2 to 3 times as long as the spikelet; spikelets 3 mm long; fruit strongly rugose. ⊙ —Cultivated soil and waste places, New Brunswick to South Dakota, south to northern Florida and Texas, occasional from British Columbia to California and New Mexico; Jamaica, at high altitudes (fig. 1563); introduced from Europe; widely distributed in temperate regions. This species has been erroneously referred to *S. glauca* (L.) Beauv.

2. Setaria geniculâta (Lam.) Beauv. KNOTROOT BRISTLEGRASS. (Fig. 1564.) Resembling *S. lutescens* but perennial, producing short knotty branching rhizomes as much as 4 cm long; base of plant slender, wiry; blades mainly straight (not twisted as in *S. lutescens*); bristles

yellow or purple, 1 to 3 times or even 6 times as long as the spikelet; spikelets 2 to 2.5 or even 3 mm long. ♃ —Open ground, pastures, cultivated soil, salt marshes, and moist ground along the coast, Massachusetts to Florida and Texas, in the interior north to West

FIGURE 1562.—*Setaria lutescens.* Plant, × ½; two views of spikelet, and floret, × 10. (Chase 2986, D.C.)

Virginia, Illinois, and Kansas, west to California; tropical America to Argentina and Chile (fig. 1565).

Setaria nigriróstris (Nees) Dur. and Schinz. Perennial; resembling *S. lutescens* but the dense spikelike racemes purple or dark brown. ♃ —Ballast, near Portland, Oreg.; South Africa.

3. Setaria verticilláta (L.) Beauv. Bur bristlegrass. (Fig. 1566.) Annual, often much branched at base and geniculate-spreading, as much as 1 m long; blades flat, rather thin, scabrous and often more or less pilose, 10 to 20 cm long, 5 to 10 mm wide; panicle erect but not stiff, cylindric or somewhat tapering upward, more or

Figure 1564.—*Setaria geniculata*, ×1. (Chase 2981, Md.)

Figure 1563.—Distribution of *Setaria lutescens.*

Figure 1566.—*Setaria verticillata*, ×1. (Steele, D.C.)

less lobed or interrupted, especially toward base, 5 to 15 cm long, 7 to 15 mm wide; bristles single below each spikelet, 1 to 3 times as long as the spikelet, retrorsely scabrous; spikelets 2 mm long; fruit finely rugose. ⊙ —Cultivated soil and waste places, Massachusetts to North Dakota, south to Alabama and Missouri, occasional west to California (fig. 1567); introduced from Europe; tropical America at medium altitudes.

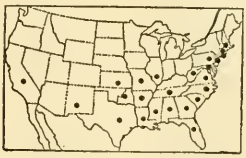

Figure 1565.—Distribution of *Setaria geniculata.*

Setaria verticillata var. ambígua (Guss.) Parl. Differing from *S. verticillata* in the scabrous but not pilose axis of the panicle and the antrorsely scabrous bristles, mostly 2 to 3 times as long as the spikelets, at maturity spreading and more or less implicate. ⊙ —Sparingly introduced in the United States, ballast, and waste places, Albany, N.Y., Philadelphia, District of Columbia, and Mobile, Ala.; Europe.

4. Setaria macrospérma (Scribn. and Merr.) Schum. (Fig. 1568.) Perennial, often in large tufts, 1 to 1.5 m tall; sheaths keeled; blades elongate, 1 to 2 cm wide, scabrous on upper surface; panicle 15 to 30 cm long, 2 to 4 cm wide, tapering to both ends, rather loose, the secondary

panicles smaller, compact, the branches of the terminal panicle as much as 2 cm long, about equally distributed; bristles single below each spikelet, 1.5 to 3 cm long; spikelets 3 mm long. ♃ —Open ground, mostly on coral rock or coral sand, Florida; Bahamas.

5. Setaria villosíssima (Scribn. and Merr.) Schum. (Fig. 1569.) Perennial, as much as 1 m tall; blades flat, villous or scabrous only, 15 to 30 cm long, 5 to 10 mm wide; panicle rather loose, more or less interrupted, tapering above, as much as 25 cm long, the branches ascending, the axis villous; bristles 1.5 to 2.5 cm long; spikelets about 3 mm long, the second glume slightly shorter; fruit finely rugose. ♃ —A rare or little-known species from a few localities in Texas, and possibly from Arizona. Differing from *S. macrosperma* in the villous blades and looser panicles.

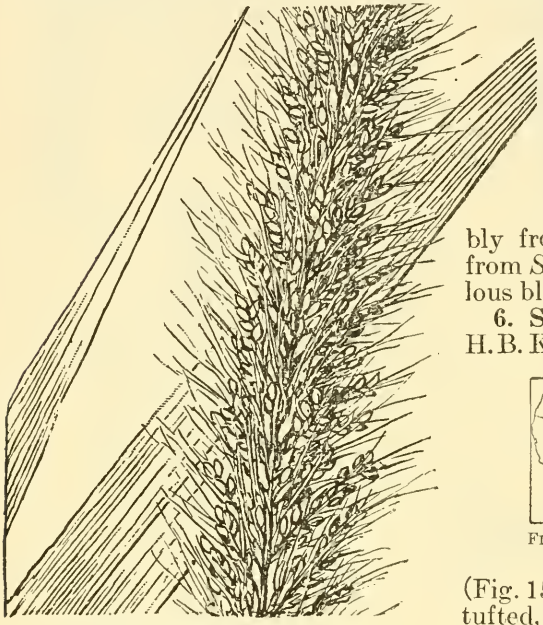

FIGURE 1568.—*Setaria macrosperma*, × 1. (Curtiss 3617, Fla.)

6. Setaria macrostáchya H.B.K. PLAINS BRISTLEGRASS.

FIGURE 1567.—Distribution of *Setaria verticillata*.

(Fig. 1570.) Perennial, densely tufted, usually pale or glaucous, 40 to 120 cm tall; blades flat or folded, scabrous on the upper surface, rarely pubescent on both surfaces, 15 to 40 cm long, 3 to 10 mm wide; panicle spikelike, 10 to 25 cm long, mostly 5 to 10 mm thick, somewhat tapering but not attenuate, more or less interrupted or lobed; bristles 10 to 15 mm long; spikelets 2 to 2.5 mm long, very turgid; fruit rugose. ♃ —Open dry ground and dry woods, Texas to Colorado and Arizona; Mexico (fig. 1571). Variable, especially in the thickness of the panicle, sometimes very slender, occasionally to 15 mm thick. The type, from Mexico, is the robust form with thick panicles.

Setaria setósa (Swartz) Beauv. Panicle interrupted, attenuate at apex. ♃ —Ballast, Camden, N.J., and Key West, Fla.; adventive from the West Indies.

Setaria rariflóra Mikan. Similar to *S. setosa*, the panicle and blades more slender. ♃ —Mobile, Ala.; adventive from South America.

7. Setaria scheélei (Steud.) Hitchc. (Fig. 1572.) Perennial, 60 to 120 cm tall; sheaths compressed-keeled, glabrous or more or less hispid, the collar hispid; blades flat, elongate, as much as 1.5 cm wide, scabrous or more or less pubescent; panicle rather loose, mostly 15 to 20 cm long, tapering from near the base, the lower branches as much as 3 cm long, ascending, the axis scabrous-pubescent and rather

sparsely villous; bristles 1 to 1.5 cm long, rather numerous, flexuous; spikelets about 2 mm long; fruit rugose. 2l — Open or rocky woods, Texas and Arizona. Differing from *S. macrostachya* in the looser panicle and the longer lower branches.

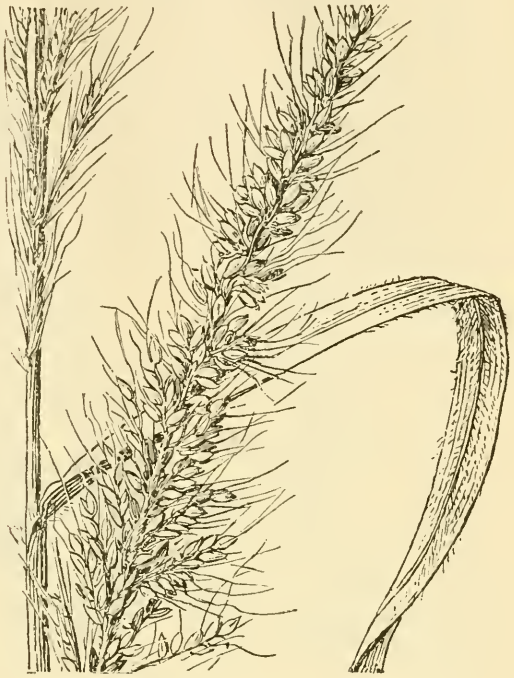

FIGURE 1569.—*Setaria villosissima*, × 1. (Smith, Tex.)

8. Setaria corrugáta (Ell.) Schult. (Fig. 1573.) Annual, erect or geniculate-spreading; culms freely branching, as much as 1 m tall; blades flat, scabrous, as much as 30 cm long and 1 cm wide (commonly less than 5 mm); panicle dense, cylindric, usually 5 to 10 cm long, the axis densely hispid-scabrous and also villous; bristles much exceeding the spikelets, sometimes as much as 2 cm long, green or purple; spikelets 2 mm long; fruit coarsely rugose. ⊙ — Sandy woods, cultivated fields, and waste places, along the coast, North Carolina to Florida and Louisiana; Cuba (fig. 1574).

FIGURE 1570.—*Setaria macrostachya*, × 1. (Hitchcock 13605, Tex.)

9. Setaria liebmánni Fourn. (Fig. 1575.) Annual, branching below, 30 to 100 cm tall; blades flat, rather thin, 10 to 20 cm long, 1 to 2 cm wide, scabrous; panicle loosely flowered, tapering at each end, often nodding, usually 10 to 25 cm long, from slender to 25 mm wide; bristles 7 to 15 mm long; spikelets about 2 mm long; fruit coarsely and strongly rugose. ⊙ —Open sandy or rocky soil, Arizona (Tucson); Mexico to Nicaragua.

10. Setaria grisebáchii Fourn. GRISEBACH BRISTLEGRASS. (Fig. 1576.) Resembling *S. liebmanni*; blades smaller, panicle branches densely flowered; fruit finely rugose. ⊙ —Open ground, often a weed in fields, Texas to Arizona; Mexico,

11. Setaria mágna Griseb. GIANT BRISTLEGRASS. (Fig. 1577.) Annual, robust, erect; culms sparingly branching, as much as 4 m tall and 2 cm thick at base; blades flat, scabrous, as much as 50 cm long and 3.5 cm wide; panicles densely flowered, nodding, often interrupted at base, tapering at each end, as much as 50 cm long and 3 cm thick, those of the branches much smaller; bristles 1 to 2 cm long; spikelets about 2 mm long; fruit smooth or nearly so, brown and shining at maturity. ⊙ —Marshes and wet places along the coast, New Jersey to Florida and Texas; West Indies (fig. 1578).

FIGURE 1571.—Distribution of *Setaria macrostachya.*

FIGURE 1572.—*Setaria scheelei,* × 1. (Bush 1244, Tex.)

FIGURE 1573.—*Setaria corrugata,* × 1. (Pollard and Collins 253, Fla.)

12. Setaria víridis (L.) Beauv. GREEN BRISTLEGRASS. (Fig. 1579.) Annual, branching at base, sometimes geniculate-spreading, 20 to 40 cm tall (or even 1 m); blades

FIGURE 1574.—Distribution of *Setaria corrugata.*

flat, usually less than 15 cm long and 1 cm wide; panicle erect or somewhat nodding, densely flowered, green or purple, cylindric but tapering a little at the summit, usually less than 7 cm long; bristles 1 to 3 below each spikelet, mostly 3 to 4 times their length; spikelets 2 to 2.5 mm long; fruit very finely rugose. ⊙ —A weed in cultivated soil and waste places, common throughout the cooler parts of the United States, Newfoundland to British Columbia, south to Florida and California, infrequent in the Southern States and in the mountains; introduced from Europe.

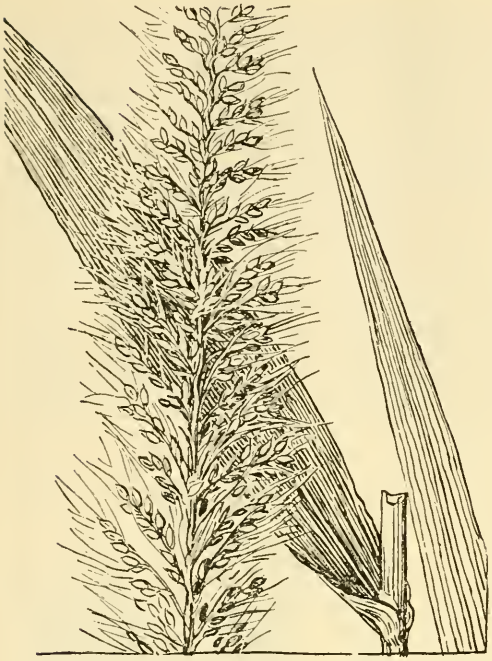

FIGURE 1575.—*Setaria liebmanni*, × 1. (Palmer 52, Mex.)

FIGURE 1576.—*Setaria grisebachii*, × 1. (Metcalfe 1262, N.Mex.)

FIGURE 1578.—Distribution of *Setaria magna*.

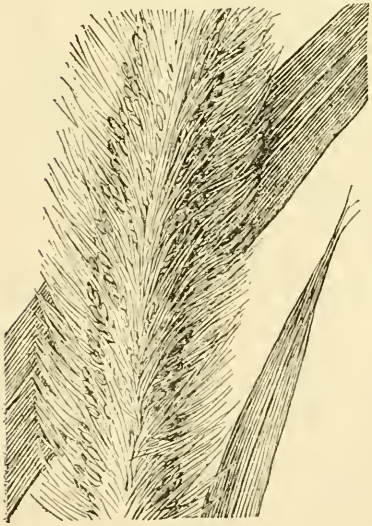

FIGURE 1577.—*Setaria magna*, × 1. (Nash 1279, Fla.)

FIGURE 1579.—*Setaria viridis*, × 1. (Thompson 129, Kans.)

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13. Setaria itálica (L.) Beauv. FOXTAIL MILLET. (Fig. 1580.) Cultivated form of *S. viridis*, more robust, with broader blades and larger lobed panicles, the fruit smooth or nearly so, shining at maturity, falling away from the remainder of the spikelet. In the larger forms the culms may be as much as 1 cm thick and the panicles as much as 30 cm long and 3 cm thick, yellow or purple; bristles from scarcely longer than the spikelets to 3 to 4 times as long; fruit tawny to red, brown, or black. The smaller forms are known as Hungarian grass. ⊙ —Cultivated in the warmer parts of the United States, especially from Nebraska to Texas; escaped from cultivation in waste places throughout the United States; Eurasia.

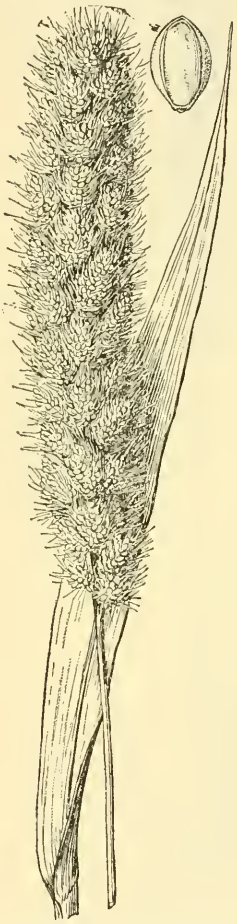

FIGURE 1580.—*Setaria italica*, ×1; floret, ×5. (Williams 82, D.C.)

Setaria barbâta (Lam.) Kunth. Decumbent annual; blades thin, lightly plicate, 1 to 2.5 cm wide; panicles narrow, loose; bristles 5 to 10 mm long. ⊙ —Ballast, Apalachicola and Miami, Fla.; adventive from East Indies.

FIGURE 1581.—*Setaria palmifolia*, ×1. (Hitchcock 9727, Jamaica.)

SETARIA PALMIFÓLIA (Willd.) Stapf. PALMGRASS. (Fig. 1581.) Tall perennial; blades plicate, as much as 50 cm long and 6 cm wide; panicle loose, 20 to 40 cm long; bristles inconspicuous. ♃ —Cultivated in the South and in greenhouses for ornament. (Sometimes called *Panicum plicatum*.) Native of India.

SETARIA POIRETIÁNA (Schult.) Kunth. Differing from *S. palmifolia* in having a narrow panicle about 30 cm long with numerous ascending branches. ♃ —Occasionally cultivated for ornament. (Sometimes called *Panicum sulcatum*.) Tropical America. The last three species belong to the section *Ptychophýllum*.

136. PENNISÉTUM L. Rich.

Spikelets solitary or in groups of two or three, surrounded by an involucre of bristles (sterile branchlets), these not united except at the very base, often plumose, falling attached to the spikelets; first glume shorter than the spikelet, sometimes minute or wanting; second glume shorter than or equaling the sterile lemma; fertile lemma chartaceous, smooth, the margin thin, enclosing the palea. Annuals or perennials, often branched, with usually flat blades and dense spikelike panicles. Type species, *Pennisetum typhoideum* L. Rich. (*P. glaucum*). Name from Latin *penna*, feather, and *seta*, bristle, alluding to the plumose bristles of some species.

The most important species is *P. glaucum*, pearl millet, which is widely cultivated in tropical Africa and Asia, the seed being used for human food. It has been cultivated since prehistoric times, its wild prototype being unknown. In the United States pearl millet is used to a limited extent in the Southern States for forage, especially for soiling. Two species, *P. villosum* and *P. ruppelii*, are cultivated for ornament. An African species, *P. purpureum*, elephant or Napier grass, is used in the Southern States as a forage plant.

Plants annual; bristles of involucre about as long as the spikelets. Cultivated. 1. P. GLAUCUM.

Plants perennial; bristles much longer than the spikelets.

Longer bristles 1 cm long.

Bristles unlike, the inner silky, plumose ..... 2. P. SETOSUM.

Bristles all scabrous ..... 3. P. NERVOSUM.

Longer bristles 3 to 4 cm long, the panicles feathery.

Panicle oval, tawny ..... 4. P. VILLOSUM.

Panicle elongate, purple or rosy ..... 5. P. RUPPELII.

1. Pennisetum glaúcum (L.) R. Br. PEARL MILLET. (Fig. 1582.) Annual; culms robust, as much as 2 m tall, densely villous below the panicle; blades flat, cordate, sometimes as much as 1 m long and 5 cm wide; panicle cylindric, stiff, very dense, as much as 40 to 50 cm long and 2 to 2.5 cm thick, pale, bluish tinged, or sometimes tawny, the stout axis densely villous; fascicles peduncled, spikelets short-pediceled, 2 in a fascicle, 3.5 to 4.5 mm long, obovate, turgid, the grain at maturity protruding from the hairy-margined lemma and palea. (*P. typhoideum* L. Rich.; *Penicillaria spicata* Willd.)—Cultivated to a limited extent in the Southern States for forage; Eastern Hemisphere.

Pennisetum purpúreum Schumach. NAPIER GRASS. Robust leafy perennial, 2 to 4 m tall; blades elongate, 2 to 3 cm wide; panicle dense, elongate, stiff, tawny or purplish, with sparsely plumose bristles about 1 cm long. 2 —Introduced from Africa; used as a forage plant in southern Florida; grown in the West Indies and South America. Also called elephant grass.

2. Pennisetum setósum (Swartz) L. Rich. (Fig. 1583.) Perennial; culms sometimes 30 or more in loose clumps, 1 to 2 m tall, geniculate, sometimes rooting at the lower nodes, bearing 1 to several flowering branches from the lower and middle nodes, scabrous below the panicle; blades elongate, 4 to 18 mm wide; panicle 10 to 25 cm long, 8 to 10 mm thick, excluding the bristles, rather dense, yellow to purple; fascicles reflexed at maturity; bristles unequal, the outer delicate, mostly

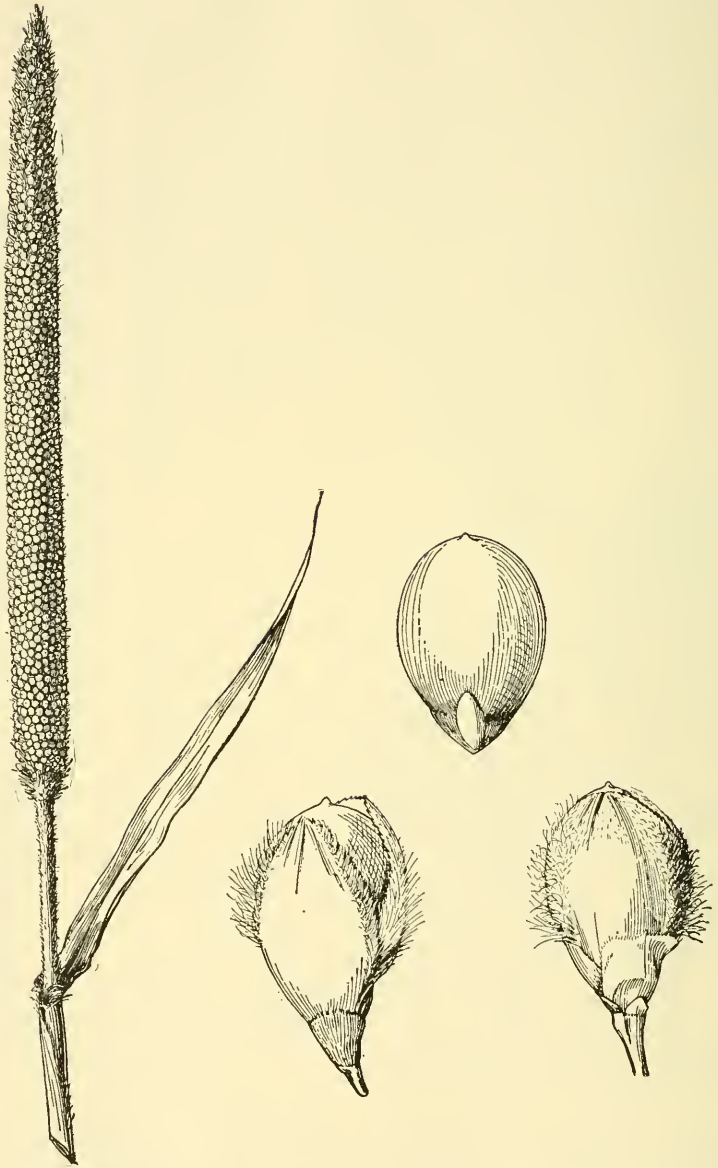

FIGURE 1582.—*Pennisetum glaucum.* Panicle, × ½; two views of spikelet and grain, × 10. (McCarthy, N.C.)

shorter than the spikelet, the inner densely silky-plumose below, as much as 1 cm long; spikelets solitary, 3.2 to 4 mm long. ♃ —Open slopes and savannas, southern Florida; tropical America.

3. Pennisetum nervósum (Nees) Trin. (Fig. 1584.) Perennial; culms robust, branching, as much as 3 m tall; blades elongate, 5 to 10 mm wide, scabrous; panicle dense, somewhat flexuous, 10 to 20 cm long; fascicles spreading to reflexed; bristles scabrous, the outer about as long as the spikelet, the inner about 10 mm long; spikelet solitary, 5 to 6 mm long. ♃ —Moist open or brushy places, Brownsville,

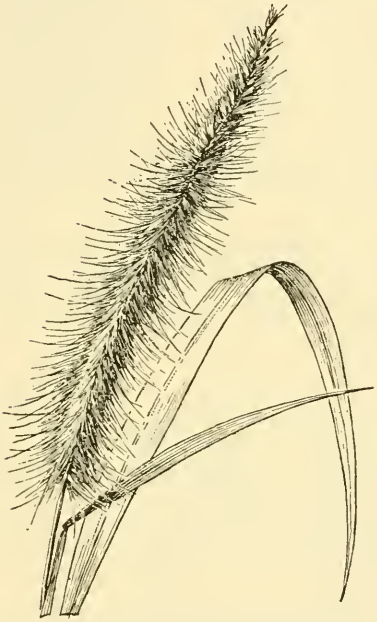

FIGURE 1583.—*Pennisetum setosum*, × ½. (Amer. Gr. Nat. Herb. 611, Trinidad.)

FIGURE 1584.—*Pennisetum nervosum*, × ½. (Ferris and Duncan 3198, Tex.)

Tex., a single locality along the Rio Grande, apparently introduced; Ecuador to Brazil and Argentina.

4. Pennisetum villósum R. Br. FEATHERTOP. (Fig. 1585.) Perennial; culms tufted, 30 to 60 cm tall, pubescent below the panicle; blades 3 to 5 mm wide; panicle tawny, ovoid or oblong, 3 to 10 cm long, 1 to 5 cm wide including bristles, dense, feathery; spikelets 1 to 4 in a fascicle; fascicles short-peduncled, a tuft of white hairs at base of peduncle; bristles numerous, spreading, the inner very plumose, the longer 4 to 5 cm long. ♃ (*P. longistylum* of florists, not Hochst.)—Cultivated for ornament, sparingly escaped in dry ground, Michigan, Texas, and California; introduced from Africa.

5. Pennisetum ruppélii Steud. FOUNTAIN GRASS. (Fig. 1586.) Perennial, culms tufted, simple, about 1 m tall; blades narrow, elon-

gate, scabrous; panicle 15 to 35 cm long, nodding, pink or purple; fascicles peduncled, rather loosely arranged, containing 1 to 3 spikelets; bristles plumose toward base, unequal, the longer 3 to 4 cm long. ♃ —Cultivated for ornament, especially as a border plant or around fountains. Introduced from Africa. Referred by some to *P. setaceum* (Forsk.) Chiov., a dubious name.

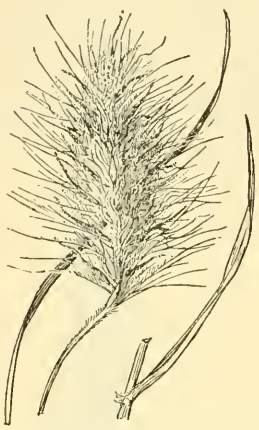

FIGURE 1585.—*Pennisetum villosum*, × ½. (Eastwood 172, Calif.)

PENNISETUM MACROSTÁCHYUM (Brongn.) Trin. Resembling *P. ruppelii;* blades as much as 2.5 cm wide; panicle denser, brownish purple, fascicles smaller; bristles not plumose. ♃ —Cultivated sparingly for ornament. East Indies.

PENNISETUM ALOPECUROÍDES (L.) Spreng. Perennial; culms tufted, slender, 60 to 120 cm tall, pubescent below the panicle; blades long, narrow; panicle 5 to 20 cm long, tawny to purple; bristles prominent, often purple, scabrous. ♃ (*P. japonicum* of gardens.)—Occasionally cultivated for ornament. China.

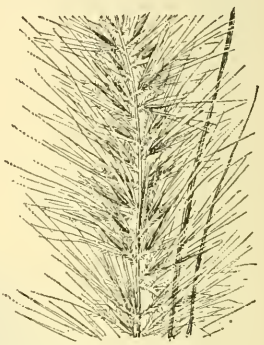

FIGURE 1586.—*Pennisetum ruppelii*, × ½. (Hitchcock, D.C.)

PENNISETUM LATIFÓLIUM Spreng. Perennial; culms 100 to 150 cm tall, the nodes appressed-pubescent; blades 2 to 3 cm wide, tapering to a long point; panicles terminal and axillary, nodding, 5 to 8 cm long, the bristles prominent. ♃ —Occasionally cultivated for ornament. South America.

137. CÉNCHRUS L. SANDBUR

Spikelets solitary or few together, surrounded and enclosed by a spiny bur composed of numerous coalescing bristles (sterile branchlets), the bur subglobular, the peduncle short and thick, articulate at base, falling with the spikelets and permanently enclosing them, the seed germinating within the old involucre, the spines usually retrorsely barbed. Annuals or sometimes perennials, commonly low and branching, with flat blades and racemes of burs, the burs readily deciduous. Type species, *Cenchrus echinatus*. Name from Greek *kegchros*, a kind of millet.

The species are excellent forage grasses before the burs are formed. Several species are weeds and become especially troublesome after the maturity of the burs.

Involucral lobes united at the base only. Racemes dense; plants perennial. 1. C. MYOSUROIDES.

Involucral lobes united above the base.

Involucre with a ring of slender bristles at base. Plants annual.

Burs, excluding the bristles, not more than 4 mm wide, numerous, crowded in a long raceme; lobes of the involucre interlocking, not spinelike. 2. C. VIRIDIS.

Burs, excluding the bristles, 5 to 7 mm wide, not densely crowded; lobes of the involucre erect or nearly so or rarely one or two lobes loosely interlocking, the tips spinelike ..... 3. C. ECHINATUS.

Involucre with flattened spreading spines, no ring of slender bristles at base.

Body of bur ovate, usually not more than 3.5 mm wide, tapering at base; plants perennial.

Burs glabrous; spines 4 to 6 mm long ..... 4. C. GRACILLIMUS.

Burs pubescent; spines rarely more than 4 mm long, usually shorter. 5. C. INCERTUS.

Body of bur globose, 5 mm wide or more, not tapering at base; plants annual.
Burs, including spines, 7 to 8 mm wide, finely pubescent.
6. C. PAUCIFLORUS.
Burs, including spines, 10 to 15 mm wide, densely woolly.
7. C. TRIBULOIDES.

1. Cenchrus myosuroídes H. B. K. (Fig. 1587.) Stout glaucous woody perennial; culms erect from an often decumbent base, 1 to 1.5 m

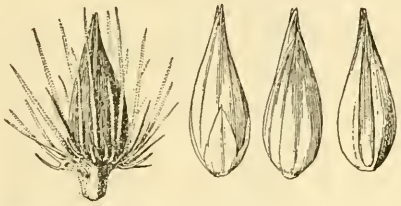

FIGURE 1587.—*Cenchrus myosuroides.* Bur, two views of spikelet, and floret, × 5. (Léon 835, Cuba.)

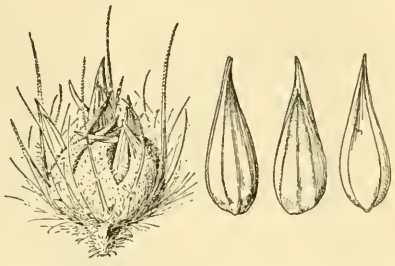

FIGURE 1588.—*Cenchrus viridis.* Bur, two views of spikelet, and floret, × 5. (Type.)

tall, branching below; blades 5 to 12 mm wide; raceme 10 to 25 cm long, strict, erect, dense; burs 1-flowered, about 5 mm wide, the bristles united at the base only, the outer shorter, the inner about as long as the spikelet; spikelet 4.5 to 5.5 mm long. ♃ —Moist sandy open ground or scrubland near the coast, Georgia and Florida, southern Louisiana and southern Texas; tropical America.

Cenchrus barbátus Schum. Annual; culms 30 to 100 cm tall; raceme 8 to 10 cm long, the burs usually 2-flowered, 4 to 6 mm long,

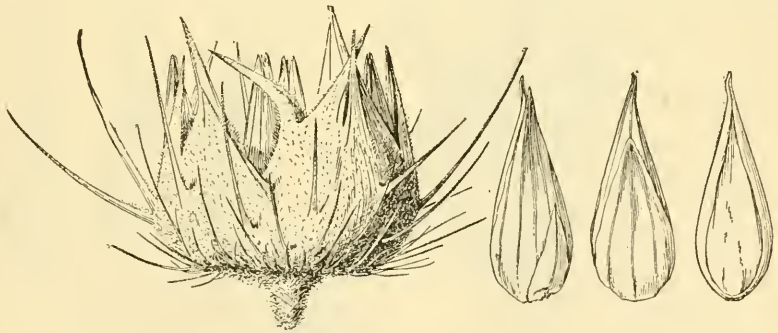

FIGURE 1589.—*Cenchrus echinatus.* Bur, two views of spikelet, and floret, × 5. (Hitchcock 9379, Jamaica.)

the outer row of bristles short, spreading, the inner flattened, rigid, erect. ☉ (*C. catharticus* Del.)—Ballast, Mobile, Ala.; native of Nubia.

2. Cenchrus víridis Spreng. (Fig. 1588.) Annual, mostly erect, 30 to 100 cm tall; blades thin, flat, lax, 6 to 12 mm wide; raceme 4 to 10 cm long, dense; burs depressed globose, about 4 mm high, the outer bristles numerous, very slender, the inner somewhat exceeding the body, the lobes interlocking at maturity; spikelets usually 3. ☉ — Open ground, often a weed in waste places, Florida Keys; tropical America at low altitudes; introduced in Malaysia.

3. Cenchrus echinátus L. (Fig. 1589.) Annual; culms, compressed, usually geniculate, branching at base, 25 to 60 cm long; blades 3 to 8 mm wide, pilose on the upper surface near the base; raceme 3 to 10 cm long, the burs larger, fewer, and less crowded than in *C. viridis;* bur 4 to 7 mm high, as broad or broader, pubescent, the lobes of the involucre erect or bent inward but not interlocking; spikelets usually 4 in each bur. ⊙ —Open ground and waste places, South Carolina to New Mexico; a common weed in tropical America (fig. 1590); sparingly introduced in Hawaii and Malaysia.

FIGURE 1590.—Distribution of *Cenchrus echinatus.*

4. Cenchrus gracíllimus Nash. (Fig. 1591.) Perennial, at length forming dense clumps, glabrous as a whole; culms slender, wiry, erect or ascending, 20 to 80 cm tall; blades usually folded, 2 to 3 mm wide; raceme 2 to 6 cm long, the burs relatively distant, about 3.5, rarely as much as 5 mm, wide (excluding spines), tapering at base, glabrous; spines spreading or reflexed, flat, 4 to 6 mm long, the lobes about 8; spikelets 2 or 3 in each bur. ♃ —Sandy open ground and high pineland, Florida, southern Alabama; Cuba, Jamaica.

5. Cenchrus incértus M. A. Curtis. COAST SANDBUR (Fig. 1592.) Perennial, glabrous as a whole; culms 25 to 100 cm tall; blades commonly folded but sometimes flat, 2 to 5 mm wide; raceme 4 to 10 cm

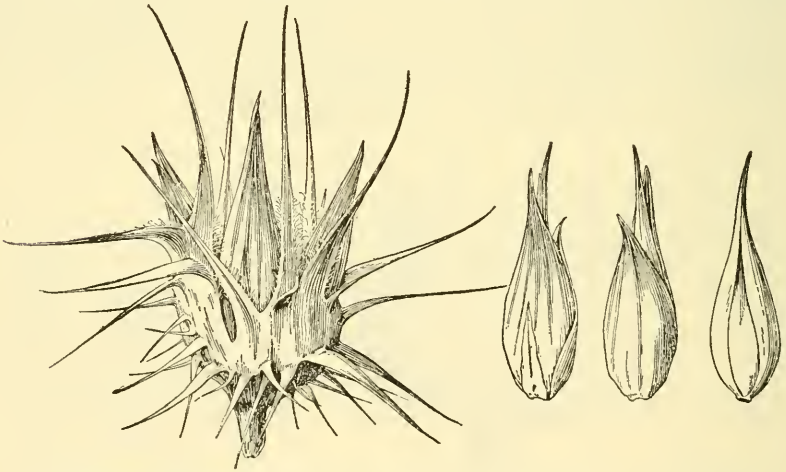

FIGURE 1591.—*Cenchrus gracillimus.* Bur, two views of spikelet, and floret, × 5. (Type coll.)

long, the burs not crowded; burs about 3.5 (3 to 5) mm wide, the body finely and densely pubescent, the base glabrous; spines few, mostly less than 5 mm long, the lower often reduced or obsolete; spikelets 1 to 3 in each bur. ♃ —Open sandy soil, Coastal Plain, North Carolina to Florida and Texas (fig. 1593).

6. Cenchrus pauciflórus Benth. FIELD SANDBUR. (Fig. 1594.) Annual, sometimes forming large mats; culms spreading, 20 to 90 cm long, rather stout; blades usually flat, 2 to 7 mm wide; raceme usually 3 to 8 cm long, the burs somewhat crowded; burs (excluding spines) mostly 4 to 6 mm wide, pubescent, often densely so; spines numerous,

spreading or reflexed, flat, broadened at base, the lowermost shorter and relatively slender, some of the upper ones commonly 4 to 5 mm long, usually villous at the base; spikelets usually 2 in each bur. ⊙ (Confused with *C. tribuloides* in early manuals; *C. carolinianus* of re-

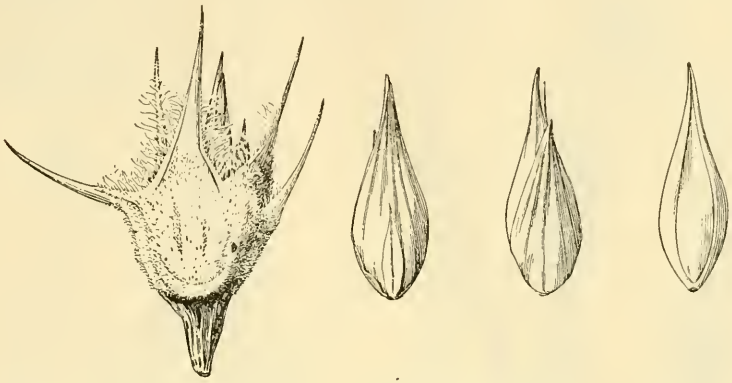

FIGURE 1592.—*Cenchrus incertus.* Bur, two views of spikelet, and floret, × 5. (Curtiss, N.C.)

cent manuals, not of Walt.)—Sandy open ground, often a weed in sandy fields, Maine to Oregon, south to Florida, Texas, and California; Mexican plateau, coastal region of tropical America; southern South America.

FIGURE 1593.—Distribution of *Cenchrus incertus.*

7. Cenchrus tribuloídes L. DUNE SAND-BUR. (Fig. 1595.) Resembling *C. pauciflorus;* culms stouter, soon branching and radiate-decumbent, rooting at the nodes; sheaths usually much overlapping; burs (excluding spines) 5 to 6 mm wide and 8 to 9 mm high, usually

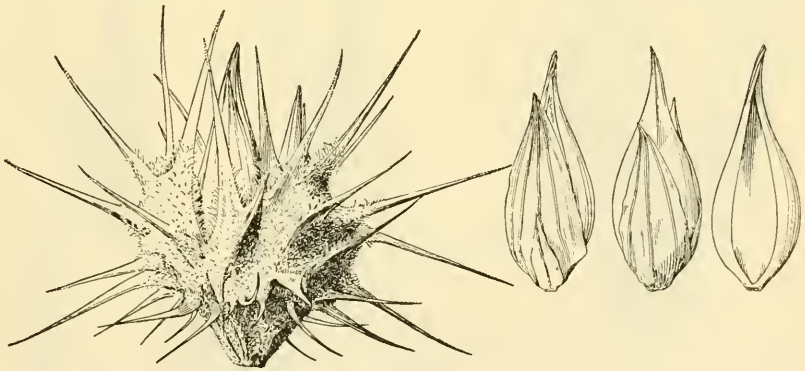

FIGURE 1594.—*Cenchrus pauciflorus.* Bur, two views of spikelet, and floret, × 5. (Hitchcock 13582, N. Mex.)

conspicuously villous. ⊙ —In loose sands of the coast, Staten Island to Florida and Louisiana; Atlantic coast of tropical America (fig. 1596).

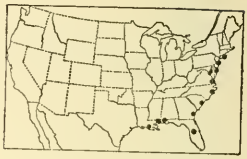

FIGURE 1596.—Distribution of *Cenchrus tribuloides.*

FIGURE 1595.—*Cenchrus tribuloides.* Plant, × ½; two views of spikelet, and floret, × 10. (Kearney, Va.)

FIGURE 1597.—*Amphicarpum purshii.* Plant, × ½; two views of aerial spikelet and floret, and subterranean spikelet and floret, × 10. (Brinton, N.J.)

138. AMPHICÁRPUM Kunth

(*Amphicarpon* Raf.)

Spikelets of two kinds on the same plant, one in a terminal panicle, perfect but not fruitful, the other cleistogamous on slender leafless subterranean branches from the base of the culm or sometimes also from the lower nodes; first glume of the aerial spikelets variable in size, sometimes obsolete; second glume and sterile lemma about equal; lemma and palea indurate, the margins of the lemma thin and flat; fruiting spikelets much larger, the first glume wanting; second glume and sterile lemma strongly nerved, subrigid, exceeded at maturity by the turgid, elliptic, acuminate fruit with strongly indurate lemma and palea, the margins of the lemma thin and flat; stamens with small anthers on short filaments. Annual or perennial erect grasses, with flat blades and narrow terminal panicles. Type species, *Milium amphicarpon* Pursh (*Amphicarpum purshii*). Name from Greek *amphikarpos*, doubly fruit-bearing, alluding to the two kinds of spikelets.

FIGURE 1598.—Distribution of *Amphicarpum purshii*.

FIGURE 1599.—*Amphicarpum muhlenbergianum*, × 1. (Chapman, Fla.)

Blades conspicuously hirsute ..... 1. A. PURSHII.
Blades glabrous or nearly so ..... 2. A. MUHLENBERGIANUM.

1. Amphicarpum púrshii Kunth. (Fig. 1597.) Annual; culms erect, 30 to 80 cm tall, the leaves crowded toward the base, hirsute; blades erect, 10 to 15 cm long, 5 to 15 mm wide, sharp-pointed; panicle 3 to 20 cm long; spikelets elliptic, 4 to 5 mm long; subterranean spikelets 7 to 8 mm long, plump, acuminate. ⊙ (*Amphicarpon amphicarpon* Nash.)—Sandy pinelands, New Jersey to Georgia (fig. 1598).

2. Amphicarpum muhlenbergiánum (Schult.) Hitchc. (Fig. 1599.) Perennial; culms usually decumbent at base, 30 to 100 cm tall; leaves evenly distributed; blades firm, white-margined when dry, mostly less than 10 cm long, 5 to 10 mm wide; panicle long-exserted, few-flowered; spikelets narrowly lanceolate, 6 to 7 mm long; subterranean spikelets 6 to 9 mm long. ♃ (*A. floridanum* Chapm.)—Low pinelands, South Carolina and Florida.

139. OLÝRA L.

Plants monoecious; inflorescence paniculate; pistillate spikelets borne on the ends of the branches of loose panicles, the smaller staminate spikelets pedicellate below the pistillate ones, sometimes the upper branches all pistillate and the lower ones all staminate; pistillate spikelets rather large; first glume wanting; second glume and sterile lemma herbaceous, often caudate-acuminate; fruit bony-indurate; staminate spikelets readily deciduous; glumes and sterile lemma wanting, the lemma and palea membranaceous. Mostly tall perennials with broad flat blades, contracted into a petiole, and open or contracted panicles of glabrous spikelets. Type species, *Olyra latifolia*. Name from *olura*, an old Greek name for a kind of grain.

1. Olyra latifólia L. (Fig. 1600.) Glabrous perennial, bamboolike in aspect, commonly 5 m tall, with flat, firm, asymmetrically lanceolate-oblong, abruptly acuminate blades commonly 20 cm long and 5 cm wide, and ovoid panicles 10 to 15 cm long, the branches stiffly ascending or spreading, each bearing a single large long-acuminate pistillate spikelet at the thickened summit and several small slender-pediceled staminate spikelets along the branches. 2↓ —Said to occur in the region of Tampa Bay, Florida, but the record is doubtful; tropical America; Africa.

TRIBE 13. ANDROPOGONEAE

140. IMPERÁTA Cyrillo

Spikelets all alike, awnless, in pairs, unequally pedicellate on a slender continuous rachis, surrounded by long silky hairs; glumes about equal, membranaceous; sterile lemma, fertile lemma, and palea thin and hyaline. Perennial, slender, erect grasses, from hard scaly rhizomes, with terminal narrow silky panicles. Type species, *Imperata cylindrica*. Named for Ferrante Imperato.

Spikelets 4 mm long, the hairs at base twice as long; panicle oblong, rather lax ..... 1. I. BRASILIENSIS.
Spikelets 3 mm long, the hairs 3 times as long; panicle elongate ... 2. I. HOOKERI.

1. Imperata brasiliénsis Trin. (Fig. 1601.) Culms 50 to 100 cm tall, from scaly rhizomes; leaves crowded below, 3 to 8 mm wide, the lower blades elongate, those of the culm short, the uppermost much reduced; panicle dense, pale or silvery, mostly about 10 cm long; spikelets 4 mm long. 2↓ —Pinelands, prairies, and Everglades, southern Florida; tropical America at low altitudes.

2. Imperata hookéri Rupr. SATINTAIL. (Fig. 1602.) Resembling *I. brasiliensis;* culms 1 to 1.5 m tall; leaves less crowded at base, all but the uppermost elongate; panicle 15 to 30 cm long; spikelets 3 mm long, the hairs 3 times as long. 2↓ —Desert regions, western Texas to southern California and Nevada; Mexico (fig. 1603).

Imperata cylíndrica (L.) Beauv. Spikelets 4 to 5 mm long, the hairs as long as in *I. hookeri*. 2↓ —Ballast, Portland, Oreg.; widespread in the Old World.

FIGURE 1600.—*Olyra latifolia*. Plant, × ½; pistillate and staminate spikelets, and fertile floret, × 5. (Chase 6416, P.R.)

FIGURE 1601.—*Imperata brasiliensis*. Plant × ½; spikelet × 5. (Chapman, Fla.)

141. MISCÁNTHUS Anderss.

Spikelets all alike, in pairs, unequally pedicellate along a slender continuous rachis; glumes equal, membranaceous or somewhat coriaceous; sterile lemma a little shorter than the glumes, hyaline; fertile lemma hyaline, smaller than the sterile lemma, extending into a delicate bent and flexuous awn; palea small and hyaline. Robust perennials, with long flat blades and terminal panicles of aggregate spreading slender racemes. Type species, *Miscanthus japonicus* Anderss. Name from Greek *mischos*, pedicel, and *anthos*, flower, both spikelets of the pair being pediceled.

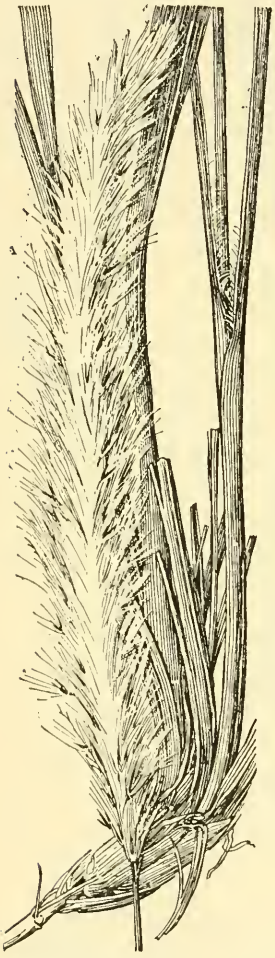

FIGURE 1602.—*Imperata hookeri*. Plant, × ½; spikelet, × 5. (Toumey 782, Ariz.)

1. Miscanthus sinénsis Anderss. EULALIA. (Fig. 1604.) Culms robust in large bunches, erect, 2 to 3 m tall; leaves numerous, mostly basal, the blades flat, as much as 1 m long, about 1 cm wide, tapering to a slender point, the margin sharply serrate; panicle somewhat fan-shaped, consisting of numerous silky aggregate racemes, 10 to 20 cm long; spikelets with a tuft of silky hairs at base surrounding them and about as long as the glumes. 2l — Cultivated for ornament and now growing wild in some localities in the Eastern States (fig. 1605); native of eastern Asia. There are three varieties in cultivation besides the usual form described above: M. SINENSIS var. VARIEGÁTUS Beal, with blades striped with white, M. SINENSIS var. ZEBRÍNUS Beal, with blades banded or zoned with white, and M. SINENSIS var. GRACÍLLIMUS Hitchc., with very narrow blades.

FIGURE 1603.—Distribution of *Imperata hookeri*.

Miscanthus nepalénsis (Trin.) Hack. Panicles yellowish brown; spikelets about one-fourth as long as the hairs at their base. 2l — Occasionally cultivated under the name of Himalaya fairy grass. Nepal, India.

142. SÁCCHARUM L.

Spikelets in pairs, one sessile, the other pedicellate, both perfect, awnless, arranged in panicled racemes, the axis disarticulating below the spikelets; glumes somewhat indurate, sterile lemma similar but hyaline; fertile lemma hyaline, sometimes wanting. Robust perennials of tropical regions. Type species, *Saccharum officinarum*. Name from Latin *saccharum* (*saccharon*), sugar, because of the sweet juice.

1. Saccharum officinárum L. SUGARCANE. (Fig. 1606.) Culms 3 to 5 m tall, 2 to 3 cm thick, solid, juicy, the lower internodes

FIGURE 1604.—*Miscanthus sinensis.* Plant, much reduced; raceme, × ½; spikelet, × 5. (Cult.)

FIGURE 1605.—Distribution of *Miscanthus sinensis.*

FIGURE 1606.—*Saccharum officinarum.* Plant, much reduced; racemes, × ½; spikelet with pedicel and rachis joint, × 5. (Pringle, Cuba.)

short, swollen; sheaths greatly overlapping, the lower usually falling from the culms; blades elongate, mostly 4 to 6 cm wide, with a very thick midrib; panicle plumelike, 20 to 60 cm long, the slender racemes drooping; spikelets about 3 mm long, obscured in a basal tuft of silky hairs 2 to 3 times as long as the spikelet. 2↓ —Cultivated in the Southern States, especially Louisiana, for sugar and byproducts, and for sirup, and also used for forage; commonly cultivated in tropical regions.

The sugarcanes cultivated in the United States are derived chiefly from four species and their hybrids. In the Noble canes (*S. officinarum*, chromosomes 40), described above, the axis of inflorescence is without long hairs. Chinese canes (*S. sinensis* Roxb., chromosomes about 58–60), with long hairs on the axis of inflorescence, are cultivated chiefly for sirup. *Saccharum barberi* Jeswiet (chromosomes about 45–46) from northern India, differs from the last in having narrower blades and more slender canes. Varieties of this species do not form an entirely homogeneous group and may later be separated into two or more species. The wild cane of Asia (*S. spontaneum* L., chromosomes 56), is used as a basis for hybrids with other species. There are numerous hybrids and varieties of the species mentioned.

SACCHARUM CILIÁRE Anderss. Tall cane; blades very scabrous; panicle 70 to 80 cm long, narrow, dense, silvery. 2↓ —Sometimes cultivated for ornament. India.

143. ERIÁNTHUS Michx. PLUMEGRASS

Spikelets all alike, in pairs along a slender axis, one sessile, the other pedicellate, the rachis disarticulating below the spikelets, the rachis joint and pedicel falling attached to the sessile spikelet; glumes coriaceous, equal, usually copiously clothed, at least at the base, with long silky spreading hairs; sterile lemma hyaline; fertile lemma hyaline, the midnerve extending into a slender awn; palea small, hyaline. Perennial reedlike grasses, with elongate flat blades and terminal oblong, usually dense silky panicles. Type species, *Erianthus saccharoides*. Name from Greek *erion*, wool, and *anthos*, flower, alluding to the woolly glumes.

Spikelets naked, or nearly so, at base ..... 1. E. STRICTUS.
Spikelets with a conspicuous tuft of hairs at base.
  Awn flat, spirally coiled at base, the upper portion more or less bent and flexuous or loosely spiral.
    Basal hairs about as long as the brownish spikelets; panicle not conspicuously hairy, the main axis and branches visible; culms usually glabrous below panicle ..... 2. E. CONTORTUS.
    Basal hairs copious, about twice as long as the yellowish spikelets; panicle conspicuously woolly, the hairs hiding the main axis and branches; culms villous below panicle ..... 3. E. ALOPECUROIDES.
  Awn terete, or flattened at base, not coiled, the upper portion straight or slightly flexuous.
    Basal hairs rather sparse, shorter than the spikelet ..... 4. E. BREVIBARBIS.
    Basal hairs copious, longer than the spikelet ..... 5. E. GIGANTEUS.

1. Erianthus strictus Baldw. NARROW PLUMEGRASS. (Fig. 1607.) Culms 1 to 2 m tall, relatively slender, glabrous; nodes hirsute with stiff erect deciduous hairs; foliage glabrous, the lower sheaths narrow, crowded, the blades mostly 8 to 12 mm wide; panicle 20 to 40 cm long, strict, the branches closely appressed; spikelets brown, about 8 mm

long, scabrous, nearly naked to sparsely short-hairy at base; awn straight, about 15 mm long; rachis joint and pedicel scabrous. 2↓ —Marshes and wet places, Coastal Plain, North Carolina to Florida and Texas, north to Tennessee and southern Missouri (fig. 1608).

FIGURE 1607.—*Erianthus strictus*, ×½. (Curtiss 6936, Fla.)

FIGURE 1608.—Distribution of *Erianthus strictus*.

2. Erianthus contórtus Ell. BENT-AWN PLUMEGRASS. (Fig. 1609.) Culms 1 to 2 m tall, glabrous or sometimes sparsely appressed-pilose below the panicle; nodes glabrous or pubescent with erect deciduous hairs; sheaths sparsely pilose at summit or glabrous; blades 1 to 1.5 cm wide, scabrous; panicle 15 to 30 cm long, narrow, the branches ascending but not closely appressed; spikelets 6 to 8 mm long, brownish, basal hairs about as long as the spikelet, awn about 2 cm long, spirally coiled at base; rachis joints and pedicels villous. 2↓ —Moist sandy pinelands or open ground, Coastal Plain, Maryland to Florida and Texas, north to Tennessee and Oklahoma (fig. 1610).

FIGURE 1609.—*Erianthus contortus*, × ½. (Amer. Gr. Nat. Herb. 234, S.C.)

FIGURE 1610.—Distribution of *Erianthus contortus*.

FIGURE 1611.—*Erianthus alopecuroides*, ×½. (Chase 4213, Fla.)

3. Erianthus alopecuroídes (L.) Ell. SILVER PLUMEGRASS. (Fig. 1611.) Culms robust, 1.5 to 3 m tall, appressed-villous below the panicle, and usually on the nodes; sheaths pilose at the summit; blades 1.2 to 2 cm wide, scabrous, pilose on upper surface toward the base; panicle 20 to 30 cm long, silvery to tawny or purplish; spikelets 5 to 6 mm long, pale, sparsely villous, shorter than the copious basal hairs; awn 1 to 1.5 cm long, flat, loosely twisted; rachis joint and pedicel long-villous. 2↓ (*E. divaricatus* Hitchc.)—Damp woods, open ground, and borders

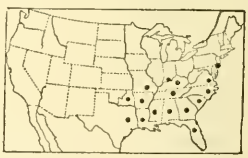

FIGURE 1612.—Distribution of *Erianthus atopecuroides*.

of fields, southern New Jersey to southern Indiana, southern Missouri, and Oklahoma, south to Florida and Texas (fig. 1612). ERIANTHUS ALOPECUROIDES var. HIRSÚTUS Nash. Sheaths and lower surface of the blades appressed-hirsute. 2↓ —Florida.

4. Erianthus brevibárbis Michx. BROWN PLUMEGRASS. (Fig. 1613.) Culms 1 to 2 m tall, glabrous, even on the nodes; sheaths appressed-pilose toward the summit; blades 1 to 1.5 cm wide, pilose on upper surface toward the base; panicle 20 to 40 cm long, brown or purplish, not conspicuously woolly; spikelets 6 to 7 mm long, brown, scabrous, the basal hairs shorter than the spikelet; awn about 2 cm long, terete, scabrous, straight or slightly flexuous; rachis joint and pedicel with a few short hairs. 2↓ —Moist places, Coastal Plain, Delaware to Florida and Louisiana (fig. 1614).

FIGURE 1613.—*Erianthus brevibarbis*, ×½. (Hitchcock, N.C.)

5. Erianthus gigantéus (Walt.) Muhl. SUGARCANE PLUMEGRASS. (Fig. 1615.) Culms 1 to 3 m tall, appressed-villous below the panicle, the nodes appressed-hispid, the hairs deciduous; sheaths and blades from nearly glabrous to shaggy appressed-villous, the blades 8 to 15 mm wide; panicle 10 to 40 cm long, oblong or ovoid, tawny to purplish; spikelets 5 to 7 mm long, sparsely long-villous on the upper part, shorter than the copious basal hairs; awn 2 to 2.5 cm long, terete, straight or slightly flexuous; rachis joint and pedicel long-pilose. 2↓ (*E. saccharoides* Michx.) —Moist soil, Coastal Plain, New York to Florida and Texas, north to Kentucky; Cuba (fig. 1616). A common form with relatively small compact panicles has been segregated as *E. compactus* Nash; a robust form with long, copiously silky, tawny panicle, as *E. tracyi* Nash; and a form with rather looser panicle, the lower rachis joints longer than the spikelets, and pubescent foliage was described from Florida as *E. laxus* Nash.

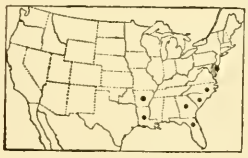

FIGURE 1614.—Distribution of *Erianthus brevibarbis*.

Erianthus ravénnae (L.) Beauv. RAVENNA GRASS. (Fig. 1617.) Culms stout, as much as 4 m tall; panicle as much as 60 cm long, silvery; spikelets awnless or nearly so. 2↓ —Cultivated for ornament; hardy as far north as New York City; native of Europe. Established along irrigation ditches near Phoenix, Ariz.

EULÁLIA Kunth

(*Pollinia* Trin.)

Spikelets in pairs, alike, perfect on an articulate rachis, one sessile, one pediceled; racemes 2 to several, digitate or approximate.

Eulalia vimínea (Trin.) Kuntze. Annual; culms slender, straggling, 50 to 100 cm long, freely branching; blades lanceolate, 3 to 8 cm long; racemes 2 to 6, sometimes only one, approximate; spikelets about 5 mm long; awns delicate, 5 to 8 mm long or wanting. ⊙ —Introduced near Richmond, Va., Old Fort, N.C., and Knox County, Tenn.; tropical Asia.

FIGURE 1615.—*Erianthus giganteus.* Plant, × ⅛; spikelet with pedicel and rachis joint, × 5. (Langlois 96, La.)

144. ARTHRÁXON Beauv.

Perfect spikelets awned, sessile, the secondary spikelet and its pedicel wanting or present only at the lower joints of the filiform articulate rachis; racemes terminating the branches of a dichotomously forking panicle, in appearance subdigitate or fascicled. Usually low creeping grasses with broad cordate-clasping blades and subflabellate panicles. Type species, *Arthraxon ciliaris* Beauv. Name from Greek *arthron*, joint, and *axon*, axis, alluding to the jointed rachis.

FIGURE 1617.—*Erianthus ravennae*, × 1. (Cult.)

1. ARTHRAXON HÍSPIDUS var. CRYPTÁTHERUS (Hack.) Honda. (Fig. 1618.) Annual; culms slender, branching, decumbent or creeping, 30 to 100 cm long; sheaths hispid; blades ovate or ovate-lanceolate, 2 to 4 cm long, 5 to 15 mm wide, ciliate toward base; panicle mostly 3 to 4 cm long, flabellate, contracting toward maturity; rachis joints slender, glabrous; spikelets 3 to 4 mm long, nerved, aculeate-scabrous, the awn short or wanting, an occasional pedicellate spikelet developed at the base of the raceme, similar to the sessile spikelets. ⊙ —Pastures, lawns, and open ground in a few localities, Pennsylvania to Florida; Missouri, Arkansas; Portland, Oreg.; introduced from the Orient (fig. 1619).

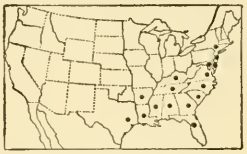

FIGURE 1616.—Distribution of *Erianthus giganteus*.

FIGURE 1618.—*Arthraxon hispidus* var. *cryptatherus*, × 1. (Cult.)

145. ANDROPÓGON L. BEARDGRASS

Spikelets in pairs at each node of an articulate rachis, one sessile and perfect, the other pedicellate and either staminate, neuter, or reduced to the pedicel, the rachis and the pedicels of the sterile spikelets often villous, sometimes conspicuously so; glumes of the fertile spikelet coriaceous, narrow, awnless, the first rounded, flat, or concave on the back, several-nerved, the median nerve weak or wanting; sterile lemma shorter than the glumes, empty, hyaline; fertile lemma hyaline, narrow, entire or bifid, usually bearing a bent and twisted awn from the apex or from between the lobes; palea hyaline, small or wanting; pedicellate spikelet awnless, sometimes staminate and about as large as the sessile spikelet, sometimes consisting of one or more reduced glumes, sometimes wanting, only the pedicel present. Rather coarse grasses (perennial in the United States), with solid culms, the spikelets arranged in racemes, these numerous, aggregate on an exserted

FIGURE 1619.—Distribution of *Arthraxon hispidus* var. *cryptatherus*.

peduncle, or single, in pairs, or sometimes in threes or fours, the common peduncle usually enclosed by a spathelike sheath, these sheaths often numerous, the whole forming a compound inflorescence, usually narrow, but sometimes in dense subcorymbose masses. Standard species, *Andropogon distachyus* L. Name from Greek *aner* (*andr-*), man, and *pogon*, beard, alluding to the villous sterile pedicels.

Several of the species, especially in the Southwest, are regarded as good forage grasses but may soon become woody toward maturity and thus decrease in value. *Andropogon furcatus*, bluejoint turkeyfoot, is the most important constituent of the wild hay of the prairie States. The amount is decreasing rapidly because the rich land upon which it grows is being converted into cultivated fields. Prairie beardgrass (*A. scoparius*) is also a common constituent of wild hay.

Racemes solitary on each peduncle. Apex of rachis joints obliquely cup-shaped. SECTION 1. SCHIZACHYRIUM.

Racemes 2 to numerous on each peduncle.

Racemes 2 to several on each peduncle, digitate; joints of rachis slender, sometimes with a shallow groove on one side ..... SECTION 2. ARTHROLOPHIS.

Racemes several to numerous (rarely few) in a leafless panicle usually on a relatively long axis, the joints of the rachis flat, the margins thick and ciliate, the center very thin ..... SECTION 3. AMPHILOPHIS.

Section 1. Schizachyrium

Blades slender, terete, the upper surface a mere groove ..... 1. A. GRACILIS.

Blades flat or folded, not terete.

First glume of sessile spikelet pubescent ..... 3. A. HIRTIFLORUS.

First glume of sessile spikelet glabrous.

Internodes of rachis relatively thick, glabrous or ciliate at base and near apex only; racemes straight.

Sessile spikelet 4 mm long; blades about 1 mm wide ..... 2. A. TENER.

Sessile spikelet 6 to 9 mm long; blades mostly 2 to 3 mm wide.

Sterile pedicel ciliate from below the middle to the apex; sterile spikelet about 3 mm long, the awn somewhat exserted .. 4. A. SEMIBERBIS.

Sterile pedicel ciliate only at the apex; sterile spikelet about 5 mm long, the awn wanting or included ..... 5. A. CIRRATUS.

Internodes of rachis and sterile pedicels slender, villous throughout or nearly so; racemes flexuous.

Culms tufted; rhizomes wanting (base sometimes slightly rhizomatous in *A. littoralis*).

Lower sheaths not broad nor conspicuously keeled; hairs on rachis and pedicels 2 to 3 mm long ..... 6. A. SCOPARIUS.

Lower sheaths relatively broad, crowded and strongly keeled.

Sheaths and blades glabrous; pedicellate spikelet reduced. 7. A. LITTORALIS.

Sheaths and blades villous; pedicellate spikelet prominent. 10. A. DIVERGENS.

Culms solitary or few together; creeping rhizomes developed.

Sessile spikelets 5 to 7 mm long; sterile spikelets much reduced. 8. A. STOLONIFER.

Sessile spikelets 8 to 10 mm long; sterile spikelets mostly not much reduced ..... 9. A. MARITIMUS.

Section 2. Arthrolophis

1a. Pedicellate spikelet staminate, similar to the sessile spikelet.

Rhizomes short or wanting; rachis joint and sterile pedicel ciliate, the joints short-hispid at base; awn of sessile spikelet 1 to 2 cm long. 11. A. FURCATUS.

Rhizomes well developed; rachis joint and sterile pedicel densely long-villous; awn of sessile spikelet rarely more than 5 mm long, often obsolete. 12. A. HALLII.

1b. Pedicellate spikelet reduced to 1 or 2 glumes, or obsolete, the pedicel only developed; racemes silky-villous.

2a. Inflorescence very decompound, the profuse pairs of racemes aggregate in an elongate or corymbose mass; spathes rarely more than 2 mm wide; pedicellate spikelet obsolete (see also *A. virginicus* var. *hirsutior*.)
24. A. GLOMERATUS.

2b. Inflorescence not conspicuously decompound nor dense (rather dense in *A. virginicus* var. *hirsutior*).

3a. Peduncle not more than 1 cm long, the dilated spathes exceeding the 2 (occasionally 3 or 4) racemes.

Upper sheaths inflated spathelike, aggregate, the late inflorescence a flabellate tuft---------- 25. A. ELLIOTTII.

Upper sheaths not inflated and aggregate.

Blades of the innovations subfiliform; ligule acute, protruding from the folded blade; foliage usually glabrous---- 20. A. PERANGUSTATUS.

Blades 2 to 5 mm wide; ligule minute, concealed within the folded blade; foliage from obscurely to conspicuously pubescent.

Hairs of the racemes copious---------- 19. A. LONGIBERBIS.

Hairs of the racemes comparatively sparse.

Rachis joints shorter than the spikelets------ 22. A. CAPILLIPES.

Rachis joints as long as the spikelets-------- 23. A. VIRGINICUS.

3b. Peduncles 2 cm long or more.

4a. Peduncles not more than 5 cm long, enclosed in the spathe or only slightly exserted (see also *A. perangustatus*).

Racemes usually not more than 15 mm long; ultimate branchlets capillary, spreading or recurved, long-villous at summit.
21. A. BRACHYSTACHYS.

Racemes 2 to 5 cm long.

Racemes 4 to 6 to a peduncle, tawny; sheaths villous--13. A. MOHRII.

Racemes 2 to a peduncle, silvery or creamy white; sheaths glabrous or nearly so.

Pairs of racemes numerous; spathes inconspicuous, at least some of the peduncles as much as 5 cm long---- 17. A. FLORIDANUS.

Pairs of racemes not more than 10 to a culm; spathes dilated; peduncles 1 to 3 cm long---------- 18. A. TRACYI.

4b. Peduncles or most of them 5 to 15 cm long, long-exserted (short-exserted peduncles intermixed with long in *A. elliottii* and *A. subtenuis*).

Rachis joints longer than the spikelets; racemes 5 to 10 cm long, conspicuously slender and flexuous------ 27. A. CAMPYLORACHEUS.

Rachis joints not longer than the spikelets; racemes not more than 7 cm long, usually not more than 5 cm.

Upper sheaths inflated, overlapping, conspicuous- 25. A. ELLIOTTII.

Upper sheaths not inflated, overlapping, nor conspicuous.

Spikelets 4 mm long; racemes very flexuous, the rachis joints nearly as long as the spikelets---------- 26. A. SUBTENUIS.

Spikelets 5 to 7 mm long; racemes slightly or not at all flexuous, the rachis joints distinctly shorter than the spikelets.

Sessile spikelets about 5 mm long, about 0.5 mm wide, the glume deeply grooved; hairs of racemes not obscuring the spikelets.
16. A. ARCTATUS.

Sessile spikelets somewhat more than 5 mm long, 1 to 1.5 mm wide, the glume concave but not grooved; hairs of racemes conspicuous to copious.

Racemes copiously long-villous, the hairs about twice as long as the spikelet and obscuring it; first glume of sessile spikelet nerveless and glabrous between the keels.
15. A. TERNARIUS.

Racemes not copiously villous, the hairs about as long as the spikelet, not obscuring it; first glume of sessile spikelet scabrous and often 2-nerved between the keels.
14. A. CABANISII.

Section 3. Amphilophis

Racemes 3 to 7, not conspicuously woolly; pedicellate spikelet about as large as the sessile one. Sessile spikelet often pitted---------- 28. A. WRIGHTII.

Racemes few to many, conspicuously woolly; pedicellate spikelet reduced.

Panicle subflabellate, often short-exserted or included at base in a dilated sheath; racemes few to many on a relatively short axis; spikelets 5 to 6 mm long.
30. A. BARBINODIS.

Panicle oblong, usually long-exserted; racemes numerous on a long axis; spikelets 3.5 to 6 mm long.
First glume of sessile spikelet pitted ..... 29. A. PERFORATUS.
First glume of sessile spikelet not pitted.
Spikelets awned ..... 31. A. SACCHAROIDES.
Spikelets awnless ..... 32. A. EXARISTATUS.

SECTION 1. SCHIZACHÝRIUM (Nees) Trin.

Branching perennials; racemes solitary on each peduncle; rachis joints tapering to base, the apex obliquely cup-shaped; sessile spikelets awned, the awns twisted, geniculate.

1. Andropogon grácilis Spreng. (Fig. 1620.) Culms slender, wiry, densely tufted, erect, glabrous, 20 to 60 cm tall; blades terete, filiform; peduncles few to several, filiform, long-exserted, with a tuft of long white hairs at summit; raceme 2 to 4 cm long, silvery white; rachis slender, flexuous, copiously long-villous; sessile spikelet about 5 mm long, the awn 1 to 2 cm long; pedicellate spikelet reduced to an awned or awnless glume, the pedicel very villous. ♃ —Rocky pine woods, southern Florida; West Indies.

FIGURE 1620.—*Andropogon gracilis*, × 1. (Hitchcock 682, Fla.)

2. Andropogon téner (Nees) Kunth. (Fig. 1621.) Culms slender, tufted, sometimes reclining or decumbent, 60 to 100 cm long, the upper half rather sparingly branching; blades scarcely 1 mm wide, flat or loosely involute, often sparingly long-pilose on upper surface near base; raceme finally long-exserted, slender, subterete, glabrous, 2 to 6 cm long; sessile spikelet about 4 mm long, the awn 7 to 10 mm long. ♃ —Dry pine woods and prairies, Coastal Plain, Georgia to Florida and Texas; tropical America (fig. 1622).

FIGURE 1621.—*Andropogon tener*, × 1. (Rolfs 986, Fla.)

3. Andropogon hirtiflórus (Nees) Kunth. (Fig. 1623.) Culms tufted, 60 to 120 cm tall, erect, reddish, the upper half sparingly branching; foliage often glaucous, the blades 2 to 4 mm wide; raceme 6 to 10 cm long, the base often included in the somewhat dilated sheath, the rachis joints, pedicels, and first glume of sessile spikelet pubescent, the rachis straight; sessile spikelet about 6 mm long, the awn 10 to 15 mm long; pedicellate spikelets much reduced, short-awned. ♃ (*A. oligostachyum* Chapm.)—Pine woods, southern Georgia and Florida; tropical America (fig. 1624). ANDROPOGON HIRTIFLORUS var. FEÉNSIS (Fourn.) Hack. Blades scabrous; sessile spikelet as much as 9 mm long, the first glume minutely papillose, the

FIGURE 1622.—Distribution of *Andropogon tener*.

pubescence less copious. ♃ —Canyons and rocky slopes, western Texas to Arizona; Mexico.

4. Andropogon semiberbis (Nees) Kunth. (Fig. 1625.) Culms usually in rather small tufts, 60 to 120 cm tall, erect, pinkish, compressed, the upper third to half freely branching; blades 2 to 4 mm wide, glabrous; raceme 5 to 8 cm long, the base often included in the sheath, the rachis straight, the joints short hispid at base with erect hairs; sessile spikelet about 6 mm long, the awn 10 to 15 mm long; pedicellate spikelet much reduced, short-awned, the pedicel more or less ciliate on one margin. ♃ —Pine woods, Florida; tropical America.

FIGURE 1623.—*Andropogon hirtiflorus*, × 1. (Chase 4193, Fla.)

FIGURE 1624.—Distribution of *Andropogon hirtiflorus*.

5. Andropogon cirrátus Hack. TEXAS BEARDGRASS. (Fig. 1626.) Plants pale, glaucous to purplish; culms slender, tufted, 30 to 70 cm tall, erect, the upper half sparingly branching; blades flat, 1 to 4 mm wide, usually scabrous; raceme exserted, 3 to 6 cm long, the rachis straight; sessile spikelet 8 to 9 mm long, the awn 5 to 10 mm long; pedicellate spikelet scarcely reduced, awnless, the pedicel stiffly ciliate on one side near the summit. ♃ —Canyons and rocky slopes, western Texas to Arizona and southern California (Jamacha); northern Mexico.

FIGURE 1625.—*Andropogon semiberbis*, × 1. (C. H. Baker 327, Fla.)

6. Andropogon scopárius Michx. PRAIRIE BEARDGRASS. (Fig. 1627.) Plants green or glaucous, often purplish; culms tufted, from slender to robust, compressed, 50 to 150 cm tall, erect, the upper half freely branching; sheaths and blades commonly glabrous or nearly so, frequently sparsely pilose at their junction, rarely pubescent to villous throughout, the blades 3 to 6 mm wide, flat; raceme 3 to 6 cm long, mostly curved, the filiform peduncles mostly wholly or partly included in the sheaths, commonly spreading, the rachis slender, flexuous, pilose, sometimes copiously so; sessile spikelet 6 to 8 mm long, scabrous, the awn 8 to 15 mm long; pedicellate spikelet reduced, short-awned, spreading, the pedicel pilose. ♃ —Prairies, open woods, dry hills, and fields, Quebec and Maine to Alberta and Idaho, south to Florida and Arizona (fig. 1628). Also called little bluestem. A form with villous foliage has been segregated as *A. scoparius* var.

FIGURE 1626.—*Andropogon cirratus*, × 1. (Greene 406, N. Mex.)

FIGURE 1627.—*Andropogon scoparius.* Plant, × ½; pair of spikelets, × 5. (Amer. Gr. Nat. Herb. 268, D.C.)

villosissimus Kearney (*Schizachyrium villosissimum* Nash). *Schizachyrium acuminatum* Nash was described from a specimen, otherwise typical, having spikelets 10 mm long. ANDROPOGON SCOPARIUS var. NEOMEXICÁNUS (Nash) Hitchc. (Fig. 1629.) Rachis and pedicels copiously villous, the rachis mostly nearly straight. In the Southwest the species verges into this variety. 2l (*Schizachyrium neomexicanum* Nash.)—Sandy soil and rocky hills, Texas to Arizona.

FIGURE 1628.—Distribution of *Andropogon scoparius*.

7. Andropogon littorális Nash. (Fig. 1630.) Resembling *A. scoparius*, but culms more compressed, with broad keeled overlapping lower sheaths, often bluish-glaucous, the flat tufts crowded on a short rhizome, decumbent or bent at base; blades 4 to 6 mm wide; rachis joints and pedicels copiously long-villous. 2l —Sandy seashores, Staten Island, N.Y., New Jersey, and Delaware; Ohio (Sandusky); Indiana (sand dunes of Lake Michigan); Texas (Padre Island). Typical specimens are strikingly different from *A. scoparius*, but Texas plants with copiously villous racemes are less distinct in habit.

FIGURE 1629.—*Andropogon scoparius* var. *neomexicanus*, ×1. (Wooton, N. Mex.)

8. Andropogon stolónifer (Nash) Hitchc. (Fig. 1631.) Resembling *A. scoparius*, but the culms solitary or few in a tuft and with creeping scaly rhizomes; foliage usually glabrous, rarely villous; first glume of both sessile and pedicellate spikelets sometimes bifid at apex; sessile spikelet 5 to 7 mm long. 2l (*Schizachyrium triaristatum* Nash.)—Sandy woods, southern Georgia and Florida.

FIGURE 1630.—*Andropogon littoralis*, × 1. (Burk, N.J.)

9. Andropogon marítimus Chapm. (Fig. 1632.) Culms solitary, compressed, ascending from a decumbent, short-noded base, 50 to 60 cm long, branching toward the ends, and with long creeping rhizomes; sheaths overlapping on the short internodes, strongly keeled, commonly reddish; blades 3 to 5 mm wide, often folded and reflexed, the midnerve deeply impressed; raceme 4 to 6 cm long, the base included in the dilated sheath, the rachis very flexuous, the joints and pedicels copiously long-ciliate except at base; sessile spikelet 8 to

10 mm long, the awn 8 to 12 mm long; pedicellate spikelet scarcely reduced, short-awned. 2n —Sandy islands along the Gulf coast, western Florida, Mississippi (Horn Island), and Louisiana (Last Island).

10. Andropogon divérgens (Hack.) Anderss. (Fig. 1633.) Culms rather robust, 80 to 120 cm tall, sparingly branching toward the summit; sheaths grayish villous, the lower crowded, compressed-keeled; blades rather firm, 3 to 6 mm wide, villous, elongate, flat or folded; raceme mostly 3 to 4 cm long, mostly 6- to 8-jointed, rather stout, usually partly included, the rachis slightly to strongly flexuous, rather stout, the joints and pedicels long-ciliate on the upper half and with a short tuft of hairs at base; sessile spikelet 6 to 8 mm long, minutely roughened, the awn 5 to 10 mm long; pedicellate spikelet about as long as the sessile one, the first glume awn-tipped. 2n — Pinelands, Texas.

FIGURE 1631.—*Andropogon stolonifer*, × 1. (Fredholm 6122, Fla.)

FIGURE 1632.—*Andropogon maritimus*, × 1. (Chapman, Fla.)

FIGURE 1633.—*Andropogon divergens*, × 1. (Tharp 3094, Tex.)

SECTION 2. ARTHRÓLOPHIS Trin.

Branching perennials; racemes 2 to few on each peduncle; rachis joints slender, mostly pubescent; sessile spikelet awned.

11. Andropogon furcátus Muhl. BLUEJOINT TURKEYFOOT. (Fig. 1634.) Plants often glaucous; culms robust, often in large tufts, sometimes with short rhizomes, 1 to 2 m tall, usually sparingly branching toward the summit; lower sheaths and blades sometimes villous, occasionally densely so, the blades flat, elongate, mostly 5 to 10 mm wide, the margins very scabrous; racemes on the long-exserted terminal peduncle mostly 3 to 6, fewer on the branches, 5 to 10 cm long, usually purplish, sometimes yellowish; rachis straight, the joints and pedicels stiffly ciliate on one or both margins, the joints hispid at base; sessile spikelet 7 to 10 mm long, the first glume slightly sulcate, usually scabrous, the awn geniculate and tightly twisted below, 1 to 2 cm long; pedicellate spikelet not reduced, awnless, staminate.

EIGURE 1634.—*Andropogon furcatus.* Plant, × ½; pair of spikelets, × 5 (Amer. Gr. Nat. Herb. 255, D.C.)

2↓ (*A. provincialis* Lam.? not Retz.)—Dry soil, prairies, and open woods, Quebec and Maine to Saskatchewan and Montana, south to Florida, Wyoming, Utah, and Arizona; Mexico (fig. 1635). An important forage grass in the prairie States of the Mississippi Valley.

12. Andropogon hállii Hack. TURKEYFOOT. (Fig. 1636.) Resembling *A. furcatus*, but with creeping rhizomes; racemes conspicuously villous, the hairs grayish to pale golden; awn of sessile spikelet rarely more than 5 mm long, often obsolete. 2↓ —Sandhills and sandy soil, North Dakota and eastern Montana to Texas, Wyoming, Utah, and Arizona; Iowa (fig. 1637). Intergrades with *A. furcatus*. A form with yellow-villous racemes and awns 5 to 10 mm long has been segregated as *A. chrysocomus* Nash.

FIGURE 1635.—Distribution of *Andropogon furcatus*.

FIGURE 1636.—*Andropogon hallii*, × 1. (Hitchcock 584, Kans.)

FIGURE 1638.—*Andropogon mohrii*, × 1. (Mohr, Ala.)

13. Andropogon móhrii Hack. (Fig. 1638.) Culms stout, compressed, tufted, erect, 80 to 130 cm tall, the upper half sparingly to rather freely branching; leaves villous, the lower sheaths strongly keeled and glabrous at base, the blades elongate, 3 to 5 mm wide; inflorescence narrow, the branches approximate, the ultimate branchlets short, densely bearded at summit, the purplish spathes 4 to 6 cm long; racemes mostly 4, tawny, 2 to 4 cm long, on peduncles mostly about 2 cm long, or the terminal ones sometimes long-exserted; rachis scarcely flexuous, the joints shorter than the spikelets, copiously long-villous; sessile spikelet 4 to 5 mm long, the awn loosely twisted below, 1.5 to 2 cm long; pedicel long-villous, the spikelet reduced to a minute glume. 2↓ —Wet pine woods and sandy seacoast, North Carolina to Georgia and Louisiana (fig. 1639).

FIGURE 1637.—Distribution of *Andropogon hallii*.

14. Andropogon cabanísii Hack. (Fig. 1640.) Culms in small tufts, erect, 80 to 150 cm tall, the upper half bearing long slender branches; sheaths villous to nearly glabrous; blades 2 to 3 mm wide; inflorescence loose; racemes 2, pale grayish-tawny, with about 15 joints, 4 to 7 cm long on slender long-exserted peduncles, the spathes

narrow, inconspicuous, or a few occasionally dilated; rachis not flexuous or but slightly so, the joints shorter than the spikelets, long-villous; sessile spikelets 6 to 7 mm long, the first glume firm, scabrous and often 2-nerved between the keels, the awn twisted below, about 1.5 cm long; pedicel long-villous, the spikelet reduced to a slender glume or obsolete. 2¼ —Dry pine woods, peninsular Florida.

15. Andropogon ternárius Michx. (Fig. 1641.) Culms tufted, erect, 80 to 120 cm tall, the upper half to two-thirds branching, the branches usually long, slender and erect; leaves often purplish-glaucous, glabrous, or the lower loosely villous, the blades 2 to 4 mm wide; inflorescence elongate, loose, of few to many pairs of silvery to creamy or grayish feathery racemes, usually on long-exserted peduncles from slender inconspicuous spathes, some of the lateral peduncles often short, from dilated spathes, rarely most of them so; racemes 3 to 6 cm long, with mostly less than 12 joints, the rachis not flexuous, the joints shorter than the spikelets, copiously long-villous; sessile spikelets 5 to 7 mm long, glabrous and nerveless between the keels,

FIGURE 1639.—Distribution of *Andropogon mohrii*.

FIGURE 1640.—*Andropogon cabanisii*, × 1. (Fredholm 6416, Fla.)

FIGURE 1641.—*Andropogon ternarius*, × 1. (Chase 4557, N.C.)

the awn twisted below, 1.5 to 2 cm long; stamens 3; pedicel long-villous, the spikelet obsolete or nearly so. 2¼ —Dry sandy soil, open woods, mostly Coastal Plain, Delaware to Tennessee, Missouri, and Oklahoma, south to Florida and Texas. (Fig. 1642). Variable in the density and length of pubescence on the rachis and pedicels, the less hairy specimens verging toward *A. arctatus*.

16. Andropogon arctátus Chapm. (Fig. 1643.) Resembling *A. ternarius;* culms 1 to 1.5 m tall; the blades often wider and firmer; branches of the inflorescence rather more slender; racemes 3 to 5 cm long, tawny, sessile spikelets 4 to 5 mm long, brown, the awn 1 to 5 cm long; first glume concave, the pale or tawny hairs of rachis and pedicels shorter and less copious than in *A. ternarius;* sessile spikelet 5 mm long, 0.5 mm wide, the glume grooved; stamen 1. 2l —Low pine woods, Florida.

FIGURE 1642.—Distribution of *Andropogon ternarius.*

17. Andropogon floridánus Scribn. (Fig. 1644.) Culms often stout, 1 to 1.8 m tall; the upper one-third to half bearing long slender branches; blades elongate, 2 to 6 mm wide; inflorescence loosely subcorymbose, of usually numerous pairs of silvery white to creamy racemes on subcapillary peduncles mostly 2 to 8 cm long, included in very slender spathes or exserted, the ultimate branchlets filiform, often long-ciliate toward the summit; racemes 3 to 4 cm long, the slender rachis not flexuous, the joints a little shorter than the spikelets, rather copiously long-villous; sessile spikelets 4 to 4.5 mm long, the delicate awn straight,

FIGURE 1643.—*Andropogon arctatus,* ×1. (Chapman, Fla.)

FIGURE 1644.—*Andropogon floridanus,* ×1. (Type coll.)

6 to 10 mm long; pedicel long-villous, the spikelet obsolete. 2l —Low pine woods, Florida. An occasional peduncle bears 3 racemes.

18. Andropogon trácyi Nash. (Fig. 1645.) Culms in small tufts, slender, erect, the upper third sparingly branching; sheaths keeled, narrow, glabrous or nearly so; blades 2 to 3 mm wide, sometimes ciliate toward base; inflorescence of 8 to 10 relatively distant racemes, the slender ultimate branches often recurved, the dilated spathes 4 to 6 cm long, attenuate below, the enclosed peduncle 1 to 3 cm long;

ultimate branchlets long-bearded toward the summit; racemes 2 or 3, feathery, 2 to 4 cm long, the very slender flexuous rachis and the pedicel copiously long-villous; sessile spikelet about 4 mm long, the awn loosely twisted below, 1 to 2 cm long; pedicellate spikelet obsolete. ♃ —Pine woods, Georgia and Florida to Louisiana (fig. 1646). Resembling *A. longiberbis*, mostly more slender and with nearly glabrous foliage.

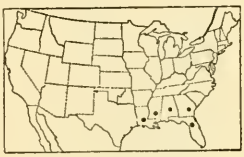

FIGURE 1646.—Distribution of *Andropogon tracyi.*

19. Andropogon longibérbis Hack. (Fig. 1647.) Resembling *A. virginicus;* sheaths, especially of the innovations, appressed grayish-villous; inflorescence on the average less compound, the racemes more copiously long-villous, the spikelets 4 to 4.5 mm long. ♃ —Pine woods, Florida. Intergrades with *A. virginicus*.

FIGURE 1645.—*Andropogon tracyi*, × 1. (Type.)

20. Andropogon perangustátus Nash. (Fig. 1648.) Culms in small tufts, slender, wiry, erect, the upper third to half sparingly branching; lower sheaths keeled, very narrow, occasionally sparsely villous; ligule about 1.5 mm long, firm; blades mostly folded, subfiliform, flexuous, glabrous or rarely pilose; inflorescence slender, of few to several racemes, resembling that of slender specimens of *A. virginicus*, the peduncles usually short but the spathes sometimes attenuate to base, the peduncle 1 to 2 cm long; racemes as in *A. virginicus*. ♃ —Bogs and moist pine woods, Florida and Mississippi.

21. Andropogon brachýstachys Chapm. (Fig. 1649.) Culms tufted, erect, 1 to 1.5 m tall, the upper half loosely branching; sheaths

crowded at base, broad, strongly keeled; blades mostly folded, 4 to 6 mm wide; inflorescence decompound, loose, the ultimate capillary branchlets commonly recurved, long-villous toward the summit; spathes slender, the long peduncles often exserted from the summit; racemes 2, flexuous, mostly 1 to 1.5 cm long, the rachis joint and pedicel long-villous; sessile spikelet about 4 mm long, the awn scarcely 1 cm long. ♃ —Moist pine woods, Florida. The racemes are frequently affected by a smut, making them shorter and denser, reducing the size of the spikelet and the awn. The inflorescence resembles that of *A. capillipes*, but the racemes mostly more numerous; the ultimate branchlets are long-villous toward the summit, and the spikelets larger.

22. Andropogon capillipes Nash. (Fig. 1650.) Plants conspicuously glaucous; culms tufted, slender, erect, 60 to 100 cm tall, the

FIGURE 1647.—*Andropogon longiberbis*, × 1. (Garber, Fla.)

FIGURE 1648.—*Andropogon perangustatus*, × 1. (Fredholm 6072, Fla.)

upper third to half with few to several slender branches; sheaths crowded at base, keeled, chalky-glaucous; blades mostly folded, 2 to 4 mm wide; inflorescence narrow but loose, the branches often flexuous to zigzag, the ultimate capillary branchlets finally spreading or recurved, glabrous, the dilated purplish-brown spathes 2 to 3.5 cm long, glabrous; racemes 2, less flexuous than in *A. virginicus*, 1 to 2.5 cm long; rachis joint about half as long as the sessile spikelet, the pedicel about equaling the spikelet, both copiously long-villous; sessile spikelet 3 mm long, the delicate straight awn about 1 cm long. ♃ —Sandy pine and oak woods, southern North Carolina, South Carolina, and Florida.

23. Andropogon virginicus L. BROOMSEDGE. (Fig. 1651.) Culms erect, 50 to 100 cm tall, usually in rather small tufts, the upper two-thirds mostly freely branching; lower sheaths compressed, keeled, equitant; sheaths glabrous or more or less pilose along the margins, occasionally conspicuously so; ligule strongly ciliate; blades flat or folded, 2 to 5 mm wide, pilose on the upper surface toward base;

inflorescence elongate, narrow, the 2 to 4 racemes 2 to 3 cm long, partly included and shorter than the inflated tawny to bronze spathes; rachis very slender, flexuous, long-villous; sessile spikelet about 3 mm long, the delicate straight awn 1 to 2 cm long; pedicel long-villous, its spikelet obsolete or nearly so. 2↓ —Open ground, old fields, open woods, sterile hills, and sandy soil, Massachusetts, New York, Indiana, and Kansas, south to Florida and Texas; Mexico, Central America, West Indies (fig. 1652). ANDROPOGON VIRGINICUS var. HIRSÚTIOR (Hack.) Hitchc. Flowering branches more numerous than in the species, the inflorescence often rather dense, resembling that of *A. glomeratus*, but the spathes mostly larger and the peduncles usually shorter. 2↓ —Moist meadows and old fields, Florida to

FIGURE 1649.—*Andropogon brachystachys*, ×1. (Curtiss 3632, Fla.)

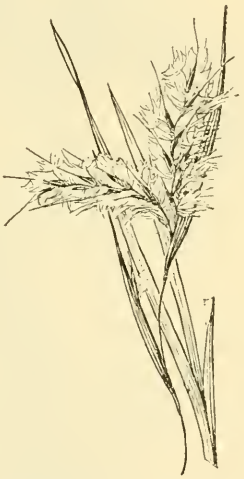

FIGURE 1650.—*Andropogon capillipes*, ×1. (Curtiss 3638b, Fla.)

Texas and Mexico. Intergrades with *A. virginicus* and appears to be intermediate between that and *A. glomeratus*. ANDROPOGON VIRGINICUS var. GLAUCÓPSIS (Ell.) Hitchc. Resembling the species, but foliage, especially the lower sheaths, very glaucous; inflorescence sometimes as dense as in var. *hirsutior*, the spathes dull purple. 2↓ (*A. glaucopsis* Nash).—Moist sandy soil and low pine barrens, North Carolina to Florida and Mississippi.

24. Andropogon glomerátus (Walt.) B. S. P. BUSHY BEARDGRASS. (Fig. 1653.) Culms erect, 50 to 150 cm tall, compressed, with broad keeled overlapping lower sheaths, the flat tufts often forming dense, usually glaucous clumps, the culms from freely to bushy branching toward the summit; sheaths occasionally villous; blades elongate, 3 to 8 mm wide; inflorescence dense, feathery, from flabellate to oblong, the paired racemes 1 to 3 cm long, about equaling the slightly dilated

FIGURE 1651.—*Andropogon virginicus.* Plant, × ½; spikelet with rachis joint and pedicel, × 5. (Earle 4, Ala.)

spathes, the enclosed peduncle and ultimate branchlets long-villous, the peduncle at least 5 mm long, often longer; rachis very slender, flexuous, long-villous; sessile spikelet 3 to 4 mm long, the awn straight, 1 to 1.5 cm long; sterile spikelet reduced to a subulate glume or wanting, the pedicel slender, long-villous. 2↓ —Low moist ground, marshes, and swamps, Massachusetts to Florida, west to Kentucky,

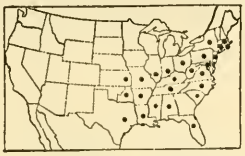

FIGURE 1652.—Distribution of *Andropogon virginicus.*

FIGURE 1655.—*Andropogon elliottii,* × 1. (Commons 115, Del.)

FIGURE 1653.—*Andropogon glomeratus,* × 1. (Hitchcock 437, Fla.)

FIGURE 1654.—Distribution of *Andropogon glomeratus.*

southern California, and Nevada; West Indies, Yucatan, Central America (fig. 1654).

25. Andropogon elliótii Chapm. ELLIOTT BEARDGRASS. (Fig. 1655.) Culms tufted, erect, 30 to 80 cm tall, at first nearly simple, later branching toward the summit; lower sheaths keeled, rather narrow, commonly loosely pilose, those near the summit inflated and spathelike, crowded, the very short internodes densely bearded; blades flat, 3 to 4 mm wide; primary inflorescence of few to several racemes, mostly in pairs, rarely 3's or 4's, on filiform, often strongly flexuous peduncles, long-exserted from inconspicuous spathes, these

on slender branchlets borne in the axils of the broad spathelike sheaths of the main culm; secondary inflorescence of numerous pairs of racemes on short peduncles subtended by broad spathes, these on short bearded often fascicled branchlets borne in the axils of the spathelike sheaths of the main culm and short primary branches, the whole forming a series of flabellate tufts with conspicuous purplish to copper-brown spathes, 5 to 10 mm wide, much exceeding the feathery racemes; racemes flexuous, 3 to 4 rarely to 5 cm long, the slender rachis joints and pedicels long-villous; sessile spikelets 4 to 5 mm long, those of the late enclosed racemes cleistogamous, the awn loosely twisted, 10 to 15 mm long; pedicellate spikelets obsolete or nearly so. 2↓ —Open ground, old fields, and open woods, mostly in the Coastal Plain, New Jersey to Florida and Texas, north to southern Missouri, Indiana, and Tennessee (fig. 1656). The flattened ferrugineous upper sheaths are conspicuous in winter. The characteristic

FIGURE 1656.—Distribution of *Andropogon elliottii.*

plant is very striking, but occasional individuals occur with less aggregate upper sheaths, and others with scarcely dilated sheaths, aggregate or scarcely aggregate. This form, which has been distinguished as *A. elliottii* var. *gracilior* Hack., appears to verge into *A. subtenuis* Nash.

FIGURE 1657.—*Andropogon subtenuis*, × 1. (Tracy 4701, Miss.)

26. Andropogon subténuis Nash. (Fig. 1657.) Culms in small tufts, slender, erect, 40 to 70 cm tall, the upper third sparingly branching; foliage glabrous or nearly so, the blades 1.5 to 2 mm wide; inflorescence narrow, of few to several pairs of racemes on elongate filiform peduncles short-exserted from near the summit of the elongate slender spathe, the ultimate branches sometimes long-villous toward the summit; racemes 2, flexuous, 2 to 3 cm long, very like the primary racemes of *A. elliottii;* spikelets 4 mm long. 2↓ —Dry sandy soil, northern Florida to Mississippi. Possibly a form of *A. elliottii* in which the enlarged sheaths and cleistogamous inflorescence are not developed.

27. Andropogon campylorácheus Nash. (Fig. 1658.) Culms tufted, erect, 40 to 80 cm tall, simple or with a few branches about

the middle; sheaths and lower part of the blades appressed-villous, the blades about 2 mm wide; racemes 2 to 4, mostly 2, on long flexuous peduncles exserted from long narrow spathes, the slender rachis very flexuous, the joints and pedicels much longer than the sessile spikelet, long-villous, the lowermost rachis joint often elongate; sessile spikelet 5 to 6 mm long, slender, the awn loosely twisted, mostly about 2 cm long; pedicellate spikelet reduced to a slender glume or obsolete. ♃ —Dry sandy pine woods, Florida, Mississippi, and Louisiana.

FIGURE 1658.—*Andropogon campyloracheus*, × 1. (Combs 677, Fla.)

FIGURE 1659.—*Andropogon wrightii*, × 1. (Metcalfe 1371, N. Mex.)

SECTION 3. AMPHÍLOPHIS Trin.

Perennials, simple or sparingly branching; racemes several to numerous in a leafless panicle, at least the lower racemes short-peduncled, mostly on a relatively long axis; rachis straight, the joints and pedicels flat, with thick bearded margins, the center subhyaline.

28. Andropogon wrightii Hack. (Fig. 1659.) Plants somewhat glaucous; culms tufted, 50 to 100 cm tall, simple, the nodes usually hispid; blades flat, 3 to 5 mm wide, tapering to a fine point; racemes 3 to 7, suberect, mostly 3 to 6 cm long, green or tawny, not conspicuously woolly, the hairs of rachis joints and pedicels much shorter than the spikelets; peduncle usually long-exserted; sessile spikelet about 6 mm long, short-pilose at base, the first glume several-nerved toward the summit, stiffly short-ciliate on the keels above; awn twisted below, geniculate, 10 to 15 mm long; pedicellate spikelet about as large as the sessile one, awnless. ♃ —Rocky hills and mesas, southern New Mexico, and northern Mexico. An occasional spikelet is found with a pitted first glume. In Mexican specimens the glumes are commonly pitted.

29. Andropogon perforátus Trin. (Fig. 1660.) Culms densely tufted, geniculate at base, 50 to 100 cm tall, simple or with a few leafy shoots at base; nodes from obscurely appressed-pubescent to densely short-bearded; blades 2 to 4 mm wide, the apex attenuate; racemes few to several, mostly 5 to 7 cm long, one or more of them on slender individual peduncles aggregate on a short axis, the common peduncle usually long-exserted; margins of rachis joints and pedicels densely long-villous; sessile spikelet 4 to 6 mm long, short-pilose at base, the first glume sparsely hairy and with a small pit like a pinhole; awn twisted below, geniculate, 2 to 2.5 cm long; pedicellate spikelet reduced. 2↓ —Mesas, rocky hills, and dry woods, southern Texas; Mexico.

30. Andropogon barbinódis Lag. (Fig. 1661.) Culms tufted, 40 to 120 cm tall, spreading to ascending, often branching below, the nodes bearded with short spreading hairs; sheaths sparsely hairy in the throat, foliage otherwise glabrous or nearly so, the blades 2 to 7 mm wide, scabrous; panicles from rather long-exserted to included at base, those of the branches often partly included in dilated sheaths, silvery to creamy white, silky, subflabellate, mostly 7 to 10 cm long; racemes several to many, or sometimes few on the branches, 2 to 6 cm long, the common axis usually shorter than the racemes, rarely longer; rachis joints and pedicels copiously long-villous, the hairs on the average longer than in *A. saccharoides;* spikelets 5 to 6 mm long, the awn twisted below, geniculate, 20 to 25 mm long; pedicellate spikelet reduced. 2↓ —Mesas, rocky slopes, and open ground, Oklahoma and Texas to California and Arizona, south through Mexico (fig. 1662). Has been confused with *A. saccharoides*, differing chiefly in the subflabellate panicle and larger spikelets.

FIGURE 1660.—*Andropogon perforatus*, × 1. (Hitchcock 5218, Tex.)

31. Andropogon saccharoídes Swartz. SILVER BEARDGRASS. (Fig. 1663.) Culms tufted, 60 to 130 cm tall, erect or ascending, often branching below, the nodes from appressed hispid to glabrous; foliage commonly glaucous, glabrous or nearly so, the blades 3 to 6 mm wide; panicle long-exserted or those of the branches short-exserted, silvery white, silky, dense, oblong, mostly 7 to 15 cm long; racemes 2 to 4 cm long, the common axis mostly at least twice as long, but readily breaking; rachis joints and pedicels long-villous; spikelets about 4 mm long, the delicate awn twisted below, geniculate, 10 to 15 mm long; pedicellate spikelet reduced. 2↓ — Prairies and rocky slopes, especially in limestone areas, Missouri to Colorado, and Alabama to Arizona and southern California (Topango Canyon); Mexico and West Indies to Brazil (fig. 1664). Our plants, which have been differentiated as *A. torreyanus* Steud., are more freely branching than the typical form of the West Indies.

32. Andropogon exaristátus (Nash) Hitchc. (Fig. 1665.) Resembling *A. saccharoides*; panicle slender, spikelets slightly smaller, awnless or nearly so; rare. 2↓ —Low open ground, southern Louisiana and eastern Texas.

FIGURE 1661.—*Andropogon barbinodis.* Plant, × ½; pair of spikelets, × 5. (Amer. Gr. Nat. Herb. 549, Ariz.)

Andropogon nodósus (Willem.) Nash. Decumbent, freely branching, low perennial, with flat blades 2 to 8 cm long, and solitary or paired racemes, the sterile spikelets as conspicuous as the fertile ones, giving the appearance of a flat 2-ranked scaly spike; awns slender, twisted and bent; peduncle pubescent below racemes. 2l —Old World species, established in a few of the West Indian islands; has been collected at Miami, Fla.

FIGURE 1662.—Distribution of *Andropogon barbinodis.*

FIGURE 1664.—Distribution of *Andropogon saccharoides.*

FIGURE 1665.—*Andropogon exaristatus,* × 5. (Type.)

FIGURE 1663.—*Andropogon saccharoides,* × 1. (Hitchcock 5370, Tex.)

CYMBOPÓGON Spreng. OILGRASS

Closely allied to *Andropogon;* the pairs of racemes included in an inflated spathe, the spathes in a large compound inflorescence; sessile and pedicellate spikelets of lower pair alike, well developed, but staminate or neuter. Robust mostly aromatic perennials, including the oilgrasses of commerce. The most important are CYMBOPOGON NÁRDUS (L.) Rendle, citronella grass, nard grass, in which the first glume of the sessile spikelet is flat on the back, and C. CITRÁTUS(DC.) Stapf, lemon grass, in which the first glume is concave on the back. These species are sometimes cultivated in gardens in southern

Florida and southern California but do not flower there. Name from Greek *kumbe*, boat, and *pogon*, beard, alluding to the boat-shaped spathes.

Vetiveria zizanioídes (L.) Nash. VETIVER. (Fig. 1666.) Robust densely tufted perennial with simple culms and large erect panicles, the slender whorled branches ascending, naked at the base, the awnless spikelets muricate. Also called khuskhus and khas-khas. ♃ —Native of the Old World, frequently cultivated in tropical America for hedges and for the aromatic roots, these being used for making screens and mats which are fragrant when wet. Vetiver oil is much used in perfumery. Escaped from cultivation in Louisiana. Name from *vettiver*, the native Tamil name.

FIGURE 1666.—*Vetiveria zizanioides*, ×½. (Hitchcock 9435, Jamaica.)

146. HYPARRHÉNIA Anderss.

Spikelets in pairs as in *Andropogon*, but spikelets of the lower pairs alike, sterile, and awnless; fertile spikelets 1 to few in each raceme, terete or flattened on the back (keeled toward the summit in *Hyparrhenia rufa*), the base usually elongate into a sharp callus, the fertile lemma with a strong geniculate awn; sterile spikelets awnless; racemes in pairs, on slender peduncles, and subtended by a spathe. Tall per-

ennials, the pairs of racemes and their spathes more or less crowded, forming a rather large elongate inflorescence. Type species, *Hyparrhenia pseudocymbaria* (Steud.) Stapf. Name from Greek *hypo*, under, and *arren*, masculine, alluding to the pair of staminate spikelets at the base of the raceme.

1. Hyparrhenia rúfa (Nees) Stapf. (Fig. 1667.) Culms erect, rather stout, 1 to 2.5 m tall; blades flat, elongate, 2 to 8 mm wide, sometimes wider, very scabrous on the margins; inflorescence 20 to 40 cm long, the pairs of racemes on long slender flexuous peduncles; racemes about 2 cm long, reddish brown, fertile spikelets mostly 5 to 7 in each raceme, 3 to 4 mm long, flattened from the back, pubescent with dark-red hairs, the pedicels and rachis joints ciliate with red hairs; awn 15 to 20 mm long, twice geniculate, twisted, red-brown, hispidulous. 2↓ —Tropics of the Old World; introduced in tropical

FIGURE 1667.—*Hyparrhenia rufa*, × 1. (Moldenke 243, Fla.)

America; sparingly cultivated in Florida (where it has escaped) and along the Gulf coast. Adapted to conditions in the regions mentioned, but only moderately valuable as a forage grass. The native name in Brazil is jaragua.

Hyparrhenia hírta (L.) Stapf. Usually not more than 1 m tall; blades usually less than 3 mm wide, more or less involute, flexuous; racemes whitish or grayish silky-villous. 2↓ —Warmer parts of the Old World; cultivated at the Florida State Experiment Station and probably elsewhere. Appears to have little forage value.

147. SÓRGHUM Moench

Spikelets in pairs, one sessile and fertile, the other pedicellate, sterile but well developed, usually staminate, the terminal sessile spikelet with two pedicellate spikelets. Tall or moderately tall

FIGURE 1668.—*Sorghum halepense.* Plant, × ½; two views of terminal raceme, × 5. (Small, Ga.)

annuals or perennials, with flat blades and terminal panicles of 1- to 5-jointed tardily disarticulating racemes. Type species, *Sorghum saccharatum* (L.) Moench. Name from *Sorgho,* the Italian name of the plant.

The sorghums and Johnson grass sometimes produce cyanogenetic compounds in sufficient abundance, especially in second growth, to cause prussic-acid poisoning in grazing animals. The leaves are often splotched with purple, due to a bacterial disease.

Plants perennial ..... 1. S. HALEPENSE.
Plants annual ..... 2. S. VULGARE.

1. Sorghum halepénse (L.) Pers. JOHNSON GRASS. (Fig. 1668.) Culms 50 to 150 cm tall, from extensively creeping scaly rhizomes; blades mostly less than 2 cm wide; panicle open, 15 to 50 cm long; sessile spikelet 4.5 to 5.5 mm long, ovate, appressed-silky, the readily deciduous awn 1 to 1.5 cm long, geniculate, twisted below; pedicellate spikelet 5 to 7 mm long, lanceolate. ♃ (*Holcus halepensis* L.)—Open ground, fields, and waste places, Massachusetts to Iowa and Kansas, south to Florida and Texas, west to southern California (fig. 1669); native of the Mediterranean region, found in the tropical and warmer regions of both hemispheres. Cultivated for forage; on account of the difficulty of eradication it becomes a troublesome weed.

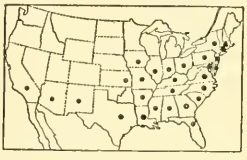

FIGURE 1669.—Distribution of *Sorghum halepense.*

2. Sorghum vulgáre Pers. SORGHUM. Differing from *S. halepense* in being annual and more robust. ☉ (*Holcus sorghum* L.)—This species has been cultivated in warmer regions since prehistoric times for the seed, which has been used for food, for the sweet juice, and for forage. In the United States it is cultivated under the general name of sorghum.

There are many varieties or races of cultivated sorghums, all of which have the same chromosome number (10) and which fall naturally into distinct groups, the chief of which (in the United States) are sorgo, kafir, durra, milo, feterita, shallu, kaoliang, broomcorn, and Sudan grass. Sorgo includes the varieties known collectively as sweet or saccharine sorghums, in which the juice in the stems is abundant and very sweet. In this country sorgo is cultivated chiefly in the region from Kansas and Texas to North Carolina for forage and for the juice which is made into sirup. The large panicles of broomcorn, grown especially in Oklahoma and Illinois, furnish the material for brooms. The other forms are grown for forage or for the seed which is used for feed. Sudan grass (*S. vulgare* var. *sudanense* (Piper) Hitchc.) is now grown extensively for pasture and for hay. This is a rather slender annual, 1 to 2 m tall with comparatively narrow blades and an open spreading panicle. This variety is more distinct than the others.

The differences between most of the varieties are so indistinct and so unstable because of intercrossing as to make it very difficult to assign descriptive limits. The application of botanical names is uncertain, and it seems best, therefore, not to assign to them definite varietal or specific Latin names.

The following names have been applied in American literature to some of the more important varieties.

FIGURE 1670.—*Sorghastrum nutans*. Plant, × ½; spikelet with pedicel and rachis joint, × 5. (Deam, Ind.)

Kafir. *S. vulgare* var. *caffrorum* (Thunb.) Hubb. and Rehder.
Shallu. *S. vulgare* var. *roxburghii* (Stapf) Haines.
Durra. *S. vulgare* var. *durra* (Forsk.) Hubb. and Rehder.
Broomcorn. *S. vulgare* var. *technicum* (Koern.) Jav.
Sorgo. *S. vulgare* var. *saccharatum* (L.) Boerl.

Tunis grass (*S. virgatum* (Hack.) Stapf) is a tall annual with a narrow slender open panicle and narrowly-lanceolate green finely-awned spikelets.—Africa. Has been tried at experiment stations but has not been brought into commercial cultivation, being inferior to Sudan grass.

148. SORGHÁSTRUM Nash

Spikelets in pairs, one nearly terete, sessile, and perfect, the other wanting, only the hairy pedicel being present; glumes coriaceous, brown or yellowish, the first hirsute, the edges inflexed over the second; sterile and fertile lemmas thin and hyaline, the latter extending into a usually well-developed bent and twisted awn. Perennial, erect, rather tall grasses, with auricled sheaths, narrow flat blades, and narrow terminal panicles of one- to few-jointed racemes. Type species, *Sorghastrum avenaceum* (Michx.) Nash (*S. nutans*). Name from *Sorghum* and the Latin suffix *astrum*, a poor imitation of, alluding to the resemblance to *Sorghum*.

FIGURE 1671.—Distribution of *Sorghastrum nutans*.

FIGURE 1672.—*Sorghastrum elliottii*, × 1. (Harper 1718, Ga.)

The most important species, *S. nutans*, is a common constituent of wild or prairie hay in the eastern part of the Great Plains region.

Awn usually 15 mm long or less, once geniculate. Panicle rather dense, yellowish ..... 1. S. NUTANS.
Awn 20 to 35 mm long, twice-geniculate, twisted below the second bend.
  Spikelets chestnut-brown, the ultimate branchlets with a few long hairs at the tip only; panicle loose, not unilateral ..... 2. S. ELLIOTTII.
  Spikelets yellowish brown, the upper portion of the ultimate branchlets conspicuously long-hairy toward the tip; panicle distinctly unilateral ..... 3. S. SECUNDUM.

1. Sorghastrum nutans. (L.) Nash. INDIAN GRASS. (Fig. 1670.) Culms 1 to 2.5 m tall from short scaly rhizomes; blades elongate, flat, mostly 5 to 10 mm wide, tapering to a narrow base, scabrous; panicle narrow, yellowish, rather dense, 15 to 30 cm long, contracted and darker at maturity; summit of branchlets, rachis joints, and pedicels grayish-hirsute; spikelets 6 to 8 mm long, lanceolate, hirsute, the awn 1 to 1.5 cm long, once-geniculate. 2♃ —Prairies, open woods, and dry slopes, Quebec and Maine to Manitoba and North Dakota, south to Florida and Arizona; Mexico (fig. 1671).

2. Sorghastrum elliótii (Mohr) Nash. (Fig. 1672.) Culms 1 to 1.5 m tall, more slender than in *S. nutans*, without rhizomes; the base comparatively delicate, smooth or nearly so; blades on the average narrower; panicle loose, 15 to 30 cm long, nodding at apex, the filiform branchlets and pedicels flexuous but not recurved, with a few long hairs at the tip; spikelets 6 to 7 mm long, chestnut brown at maturity, with a short blunt bearded callus, the first glume hirsute or glabrescent on the back; awn 2.5 to 3.5 cm long, twice-geniculate. ♃ —Open woods, dry hills, and sandy fields, eastern Maryland to Tennessee, south to Florida and Texas (fig. 1673).

3. Sorghastrum secúndum (Ell.) Nash. (Fig. 1674.) Culms 1 to 2 m tall, without rhizomes, the base robust and felty-pubescent; blades mostly less than 5 mm wide, flat or subinvolute; panicle narrow, 20 to 40 cm long, 1-sided, the branches mostly in separated fascicles, the capillary branchlets and pedicels strongly curved or circinately recurved, stiffly long-pilose below the tip; spikelets about 7 mm long, brownish, pilose, with an acute densely bearded callus 1 to 1.5 mm long. ♃ —Pine barrens, South Carolina to Florida and Texas (fig. 1675).

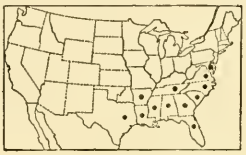

FIGURE 1673.—Distribution of *Sorghastrum elliottii.*

FIGURE 1675.—Distribution of *Sorghastrum secundum.*

FIGURE 1674.—*Sorghastrum secundum*, × 1. (Hood, Fla.)

149. RHÁPHIS Lour.

Spikelets in threes, one sessile and perfect, the other two pedicellate and sterile, or sometimes a pair below, one fertile and one sterile; fertile spikelet terete, the glumes coriaceous; sterile and fertile lemmas thin and hyaline, the latter awned. Perennial grasses, or, our species, annual, with open panicles, the three spikelets (reduced raceme) borne at the ends of long, slender, naked branches. Type species, *Rhaphis trivialis* Lour. (*R. aciculatus* Honda, *Andropogon aciculatus* Retz.). Name from Greek *rhaphis*, needle; alluding to the slender pointed callus.

1. Rhaphis pauciflórus (Chapm.) Nash. (Fig. 1676.) Annual; culms 60 to 120 cm tall, erect or somewhat decumbent at base; blades flat, mostly 4 to 8 mm wide; panicle loose, the axis 5 to 10 cm long, the branches few, very slender, 5 to 8 cm long; sessile spike-

FIGURE 1676.—*Rhaphis pauciflora*. Plant, × ½; fruiting spikelet, × 5. (Combs 1359, Fla.)

let about 1.5 cm long, including the slender villous callus about 7 mm long, this disarticulating by a long-oblique line, the tip of the pedicel thus villous on one side; awn stout, brown, geniculate, twisted below, about 15 cm long. ⊙ —Sandy pine woods, open ground, and fields, Florida; Cuba. The fruits resemble those of certain species of *Stipa* such as *S. spartea* L.

150. HETEROPÓGON Pers.

Spikelets in pairs, one sessile, the other pedicellate, both of the lower few to several pairs staminate or neuter, the remainder of the sessile spikelets perfect, terete, long-awned, the pedicellate spikelets, like the lower, staminate, flat, conspicuous, awnless; glumes of the fertile spikelet equal, coriaceous, the first brown-hirsute, infolding the the second; lemmas thin and hyaline, the fertile one narrow, extending into a strong bent and twisted brown awn; palea wanting; glumes of the staminate spikelet membranaceous, the first green, faintly many-nerved, asymmetric, one submarginal keel rather broadly winged, the other wingless, the margins inflexed, the second glume narrower, symmetric; lemmas hyaline; palea wanting. Annual or perennial, often robust grasses, with flat blades and usually solitary terminal racemes; rachis slender, the lower part, bearing the pairs of staminate spikelets, continuous, the remainder disarticulating obliquely at the base of each joint, the joint forming a sharp-barbed callus below the fertile spikelet, the pedicellate spikelet readily falling, its pedicel remaining, obscured in the hairs of the callus. Type species, *Heteropogon glaber* Pers. (*H. contortus*). Name from Greek *heteros*, different, and *pogon*, beard, alluding to the difference between the awnless staminate and awned pistillate spikelets.

One species, *H. contortus*, has a world-wide distribution. It is a good forage grass in the Southwest; if grazed constantly the troublesome awns do not develop. In the Hawaiian Islands, where it is called pili, it is an important range grass on the drier areas; also used there by the natives to thatch their grass huts. The mature fruits are injurious to sheep.

Plants perennial, less than 1 m tall; first glume of staminate spikelet usually papillose-hispid ..... 1. H. CONTORTUS.
Plants annual, usually more than 1 m tall; first glume of staminate spikelet with a row of glands along the back, glabrous ..... 2. H. MELANOCARPUS.

1. Heteropogon contórtus (L.) Beauv. TANGLEHEAD. (Fig. 1677.) Plants perennial, tufted; culms 20 to 80 cm tall, branched above, the branches erect; sheaths smooth, compressed-keeled; blades flat or folded, 3 to 7 mm wide; raceme 4 to 7 cm long, 1-sided; sessile spikelets about 7 mm long, slender, nearly hidden by the imbricate pedicellate spikelets, the awns 5 to 12 cm long, bent and flexuous, commonly tangled; pedicellate spikelet about 1 cm long, the first glume papillose-hispid toward the tip and margins, sometimes nearly glabrous. 2↓ —Rocky hills and canyons, Texas to Arizona; tropical and warmer regions of both hemispheres.

2. Heteropogon melanocárpus (Ell.) Benth. SWEET TANGLEHEAD. (Fig. 1678.) Plants annual, 1 to 2 m tall, freely branching; sheaths smooth, the upper part of the keel, especially of the upper sheaths, with a row of concave glands; blades 5 to 10 mm wide; raceme 3 to 6 cm long; looser than in *H. contortus;* sessile spikelets 9 to 10 mm long,

FIGURE 1677.—*Heteropogon contortus*. Plant, × ½; fruiting spikelet, × 5. (Griffiths 1844, Ariz.)

relatively thick, the awns 10 to 15 cm long; pedicellate spikelet 1.5 to 2.5 cm long, the first glume with a line of punctate glands along the middle. ⊙ —Pine woods, fields, and waste places, Georgia, Florida, and Alabama; Arizona; tropical regions of both hemispheres. The plant when fresh emits an odor like that of citronella oil.

151. TRACHYPÓGON Nees

Spikelets in pairs, along a slender continuous rachis, one nearly sessile, staminate, awnless, the other pedicellate, perfect, long-awned; the pedicel of the perfect spikelet obliquely disarticulating near the base, forming a sharp-barbed callus below the spikelet; first glume firm-membranaceous, rounded on the back, several-nerved, obtuse; second glume firm, obscurely nerved; fertile lemma narrow, extending into a stout twisted and bent or flexuous awn; palea obsolete; sessile spikelet persistent, as large as the fertile spikelet and similar but awnless. Perennial, moderately tall grasses, with terminal spikelike solitary or fascicled racemes. Type species, *Trachypogon montufari*. Name from Greek *trachus*, rough, and *pogon*, beard, alluding to the plumose awn of the fertile spikelet.

FIGURE 1678.—*Heteropogon melanocarpus*, ×1. (Fredholm 6405, Fla.)

1. Trachypogon montufári (H.B.K.) Nees. CRINKLE-AWN. (Fig. 1679.) Culms tufted erect, slender, hispid at the nodes, 60 to 120 cm tall; sheaths with erect auricles 2 to 5 mm long; blades flat to subinvolute, 3 to 8 mm wide; raceme solitary, rarely 2, 10 to 15 cm long; spikelets 6 to 8 mm long, pubescent, the awns of perfect spikelets 3 to 6 cm long, short-plumose below, nearly glabrous toward the tip. ♃ —Rocky hills and canyons, southern Texas, southwestern New Mexico, and southern Arizona; Mexico to Argentina.

152. ELYONÚRUS Humb. and Bonpl.

Spikelets in pairs along a somewhat tardily disarticulating rachis, the joints and pedicels short, thickened, and parallel, the sessile spikelets perfect, appressed to the concave side, the pedicellate spikelet staminate, similar to the sessile one, both awnless, the pair falling with a joint of the rachis; first glume firm, somewhat coriaceous, dorsally flattened, the margins inflexed around the second glume, a line of balsam glands on the marginal nerves, the apex entire and acute or acuminate, or bifid with aristate teeth; second glume similar to the first; sterile and fertile lemmas thin and hyaline; palea obsolete. Erect, moderately tall perennials, with solitary spikelike, often woolly racemes. Type species, *Elyonurus tripsacoides*. Name from Greek *eluein*, to roll, and *oura*, tail, alluding to the cylindric inflorescence.

FIGURE 1679.—*Trachypogon montufari*. Plant, × ½; fertile spikelet, × 5. (Griffiths and Thornber 300, Ariz.)

FIGURE 1680.—*A*, *Elyonurus barbiculmis*, × 1. (Type coll.) *B*, *E. tripsacoides*. Plant, × ½; two views of pair of spikelets with rachis joint, × 5. (Chase 4144, Fla.)

The species are important grazing grasses in the savannas and plains of tropical America, but they extend only a short distance into the United States.

Rhizomes wanting; culms hirsute below the nodes; racemes conspicuously woolly ..... 1. E. BARBICULMIS.
Rhizomes present; culms glabrous; racemes slightly pubescent, the first glume glabrous or nearly so on the back ..... 2. E. TRIPSACOIDES.

1. Elyonurus barbicúlmis Hack. (Fig. 1680, *A*.) Culms tufted, erect, simple or sparingly branching, 40 to 60 cm tall, pubescent below the nodes; blades involute, striate, about 1 mm thick, the upper surface usually long-pilose; raceme mostly 5 to 10 cm long, pale; rachis joints, pedicels, and spikelets densely woolly, the spikelets 6 to 8 mm long; first glume acuminate. ♃ —Mesas, rocky hills, and canyons, western Texas to southern Arizona; northern Mexico.

FIGURE 1681.—*Rottboellia exaltata*, × 1. (Ridley, Jamaica.)

2. Elyonurus tripsacoides Humb. and Bonpl. (Fig. 1680, *B*.) Culms 60 to 120 cm tall, glabrous, rather freely branching and with short rhizomes; blades flat or involute, 2 to 4 mm wide, slightly pilose on the upper surface near the base; raceme 7 to 15 cm long; rachis joints ciliate, the pedicels pilose; spikelets 6 to 8 mm long, the first glume ciliate toward the acuminate 2-toothed apex, usually glabrous on the back. ♃ —Moist pine woods and low prairies, Georgia, Florida, southern Mississippi, and southern Texas; Mexico to Argentina.

153. ROTTBOÉLLIA L. f.

Spikelets awnless, in pairs at the nodes of a thickened articulate rachis, one sessile and perfect, the other pedicellate, sterile; rachis joints hollow above, the thickened pedicel adnate to it, the pedicellate spikelet appearing to be sessile; sessile spikelet fitting closely against the concave side of the rachis joint, the first glume coriaceous, the second less coriaceous; sterile and fertile lemmas and palea hyaline. Coarse branching annual, with broad flat blades and subcylindric racemes, dwindling toward the summit and bearing abortive spikelets only. Type species, *Rottboellia exaltata*. Named for C. F. Rottboell.

1. Rottboellia exaltáta L. f. (Fig. 1681.) Culms robust, 1 to 3 m tall, branching; sheaths papillose-hispid, especially toward the summit; blades flat, in robust specimens as much as 3 cm wide; racemes mostly 8 to 12 cm long, 3 to 4 mm thick, dwindling at the summit; sessile spikelet 5 to 7 mm long; first glume finely papillose; pedicellate spikelet about as long as the sessile one. ⊙ (*Manisuris exaltata* Kuntze.)—Introduced at Miami, Fla.; West Indies; native of tropical Asia. The fragile hairs of the sheaths are irritating to the skin of persons handling the plant.

154. MANISÚRIS L.

Spikelets awnless, in pairs at the nodes of a thickened articulate rachis, one sessile and perfect, the other pedicellate, rudimentary (developed but sterile in *M. altissima*), the pedicel thickened and

appressed to the rachis, the sessile spikelet fitting closely against the rachis (sometimes partly adnate in *M. altissima*), forming a cylindric or flattened raceme; glumes mostly obtuse, the first coriaceous, fitting over the hollow containing the spikelet, the keels winged at the summit, the second less coriaceous than the first; sterile lemma, fertile lemma, and palea thin and hyaline. Perennial slender, moderately tall, or tall grasses, with usually numerous glabrous cylindric or flattened solitary racemes. Type species, *Manisuris myuros* L. Name from Greek *manos*, necklace, and *oura*, tail, alluding to the jointed racemes, presumably. The species probably have some forage value but they are nowhere abundant.

Racemes flattened, tardily disarticulating; first glume of sessile spikelet smooth.
1. M. ALTISSIMA.

Racemes cylindric, readily disarticulating at maturity; first glume of sessile spikelet marked with pits or wrinkles (sometimes smooth in *M. tuberculosa*).
Sheaths not compressed-keeled; first glume more or less pitted.
2. M. CYLINDRICA.

Sheaths compressed-keeled; first glume tessellated, wrinkled, tubercled, or smooth.
First glume tessellated, the depressions rectangular--- 3. M. TESSELLATA.
First glume with prominent transverse wrinkles---------- 4. M. RUGOSA.
First glume with a few low tubercles or smooth----- 5. M. TUBERCULOSA.

1. Manisuris altissima (Poir.) Hitchc. (Fig. 1682.) Perennial; culms ascending from a long creeping base, compressed and 2-edged, 40 to 80 cm long, freely branching toward the ends; blades flat, 3 to 8 mm wide; flowering branches often short and fascicled, the racemes 3 to 5 cm, sometimes 10 cm long, compressed; pedicel free or partly adnate to the rachis joint; sessile spikelet 5 to 7 mm long, the keels of the first glume very narrowly winged toward the apex; pedicellate spikelet 5 to 6 mm long, acute. ♃ (*M. fasciculata* Hitchc.)—Ponds and ditches, southern Texas; warm temperate and tropical regions of both hemispheres; introduced in America.

FIGURE 1682.—*Manisuris altissima*, ×1. (Hitchcock, Tex.)

2. Manisuris cylíndrica (Michx.) Kuntze. (Fig. 1683, *A*.) Culms tufted, with short rhizomes, erect, rather slender, 30 to 100 cm tall, simple or with a few branches; sheaths not compressed-keeled; blades flat or folded, 2 to 3 mm wide; raceme cylindric, 5 to 15 cm long, slightly curved; sessile spikelet 4 to 5 mm long, the first glume pitted along the nerves. ♃ —Pine woods and prairies, Coastal Plain, South Carolina to Florida and Texas, north to Missouri and Oklahoma (fig. 1684).

3. Manisuris tesselláta (Steud.) Scribn. (Fig. 1683, *B*.) Culms 80 to 120 cm tall, rather stout, branching; sheaths, especially the basal ones, compressed-keeled; blades elongate, flat, mostly 5 to 8 mm wide; raceme 5 to 12 cm long; sessile spikelets 4 to 5 mm long; first glume tessellated with rectangular depressions, the keels narrowly winged at the apex. ♃ —Moist pine woods, Coastal Plain, Florida to Louisiana (fig. 1685).

4. Manisuris rugósa (Nutt.) Kuntze. (Fig. 1686.) Culms mostly rather stout, 70 to 120 cm tall, freely branching; sheaths compressed-keeled; blades commonly folded, 3 to 8 mm wide; flowering branches often numerous, the racemes 4 to 8 cm long, partly included in brownish sheaths; rachis joint and pedicel contracted in the middle;

FIGURE 1683.—*A*, *Manisuris cylindrica*. Plant, × ½; two views of rachis joint with fertile and sterile spikelets attached, × 5. (Harvey, Ark.) *B*, *M. tessellata*, × 1. (Tracy and Ball 1, Miss.)

sessile spikelet 3.5 to 5 mm long, the first glume strongly and irregularly transversely ridged, the keels narrowly winged toward the summit. 2↓ —Wet pine woods, Coastal Plain, southern New Jersey to Florida and Texas (fig. 1687).

FIGURE 1684.—Distribution of *Manisuris cylindrica.*

FIGURE 1685.—Distribution of *Manisuris tessellata.*

5. Manisuris tuberculósa Nash. (Fig. 1688.) Differing from *M. rugosa* chiefly in the straight rachis joints, not contracted in the middle, and in the smooth to obscurely ridged or tuberculate first glume of the sessile spikelet, varying in a single raceme. 2↓ — Moist ground along lakes, central peninsular Florida. Apparently rare.

Eremóchloa ophiuroídes (Munro) Hack. CENTIPEDE GRASS. Low perennial, creeping by thick short-noded leafy stolons; racemes spikelike, smooth, subcylindric, terminal and axillary on slender peduncles, 2 to 6 cm long; rachis flat, not thickened as in *Manisuris*, the first glume of sessile spikelet winged at summit. 2↓ —Southeastern Asia; has been tested at southern experiment stations and has been recommended as a lawngrass for the South.

FIGURE 1686.—*Manisuris rugosa*, × 1. (Curtiss 3622, Fla.)

FIGURE 1687.—Distribution of *Manisuris rugosa.*

FIGURE 1688.—*Manisuris tuberculosa*, × 1. (Nash 1074, Fla.)

EREMOCHLOA CILIÁRIS (L.) Merr. Found near a Chinese warehouse in San Francisco. Southeastern Asia. Mentioned in the Botany of California (2: 262. 1880) under *Ischaemum leersioides* Munro. Not since collected in the United States.

155. HACKELÓCHLOA Kuntze

(*Rytilix* Raf.)

Spikelets awnless, in pairs, the rachis joint and pedicel grown together, the two clasped between the edges of the globose alveolate first glume of the sessile spikelet; pedicellate spikelet conspicuous, staminate. Freely branching annual with flat blades, the numerous racemes solitary and more or less enclosed in the spathes, these usually fascicled in the axils of the leaves. Type species, *Hackelochloa granularis*. Named for Eduard Hackel and Greek *chloa*, grass.

1. Hackelochloa granuláris (L.) Kuntze. (Fig. 1689.) Culms 30 to 100 cm tall; sheaths papillose-hispid; blades flat, 5 to 15 cm long,

3 to 15 mm wide, papillose-hirsute, ciliate; racemes 1 to 2 cm long; sessile spikelet about 1 mm thick; pedicellate spikelet about 2 mm

FIGURE 1689.—*Hackelochloa granularis.* Plant, × ½; single raceme, × 2; two views of spikelets with rachis joint, × 5. (Pringle, Ariz.)

long. ⊙ —Open ground, fields, and waste places, Georgia and Florida to Louisiana; New Mexico to Arizona (fig. 1690); tropics of both hemispheres, introduced in America. Furnishes some forage in the Southwest.

FIGURE 1690.—Distribution of *Hackelochloa granularis.*

TRIBE 14. TRIPSACEAE

156. CÓIX L. JOBS-TEARS

Spikelets unisexual; staminate spikelets 2-flowered, in twos or threes on the continuous rachis, the normal group consisting of a pair of sessile spikelets with a single pedicellate spikelet between, the latter

sometimes reduced to a pedicel or wanting; glumes membranaceous, obscurely nerved; lemma and palea hyaline; stamens 3; pistillate spikelets 3 together, 1 fertile and 2 sterile at the base of the inflorescence; glumes of fertile spikelet several-nerved, hyaline below, chartaceous in the upper narrow pointed part, the first very broad, infolding the spikelet, the margins infolded beyond the 2 lateral stronger pair of nerves; second glume narrower than the first, keeled, sterile lemma similar but a little narrower; fertile lemma and palea hyaline; sterile spikelets consisting of a single narrow tubular glume as long as the fertile spikelet, somewhat chartaceous. Tall branched grasses with broad flat blades, the monoecious inflorescences numerous on long, stout peduncles, these clustered in the axils of the leaves, each inflorescence consisting of an ovate or oval pearly white or drab, beadlike, very hard, tardily deciduous involucre (much modified sheathing bract) containing the pistillate lower portion of the inflorescence, the points of the pistillate spikelets and the slender axis of the staminate portion of the inflorescence protruding through the orifice at the apex, the staminate upper portion of the inflorescence 2 to 4 cm long, soon deciduous, consisting of several clusters of staminate spikelets. Type species, *Coix lacryma-jobi*. Name from Greek *koix*, a kind of palm, applied by Linnaeus to this grass.

FIGURE 1691.—*Coix lacryma-jobi*, ×1. (Cult.)

1. Coix lácryma-jóbi L. JOBS-TEARS. (Fig. 1691.) Annual; culms usually about 1 m tall; blades as much as 4 cm wide; beads white or bluish-white, globular or ovoid, 6 to 12 mm long. ⊙ —Occasionally cultivated for ornament, escaped into waste places in the Southern States; all tropical countries, introduced in America. The beadlike fruits are used as beads and for rosaries. A garden form (called by gardeners var. *aurea zebrina*) has yellow-striped blades.

157. TRÍPSACUM L. GAMAGRASS

Spikelets unisexual; staminate spikelets 2-flowered, in pairs on one side of a continuous rachis, one sessile, the other sessile or pedicellate, similar to those of *Zea*, the glumes firmer; pistillate spikelets solitary, on opposite sides at each joint of the thick, hard articulate lower part of the same rachis, sunken in hollows in the joints, consisting of one perfect floret and a sterile lemma; first glume coriaceous, nearly infolding the spikelet, fitting into and closing the hollow of the rachis; second glume similar to the first

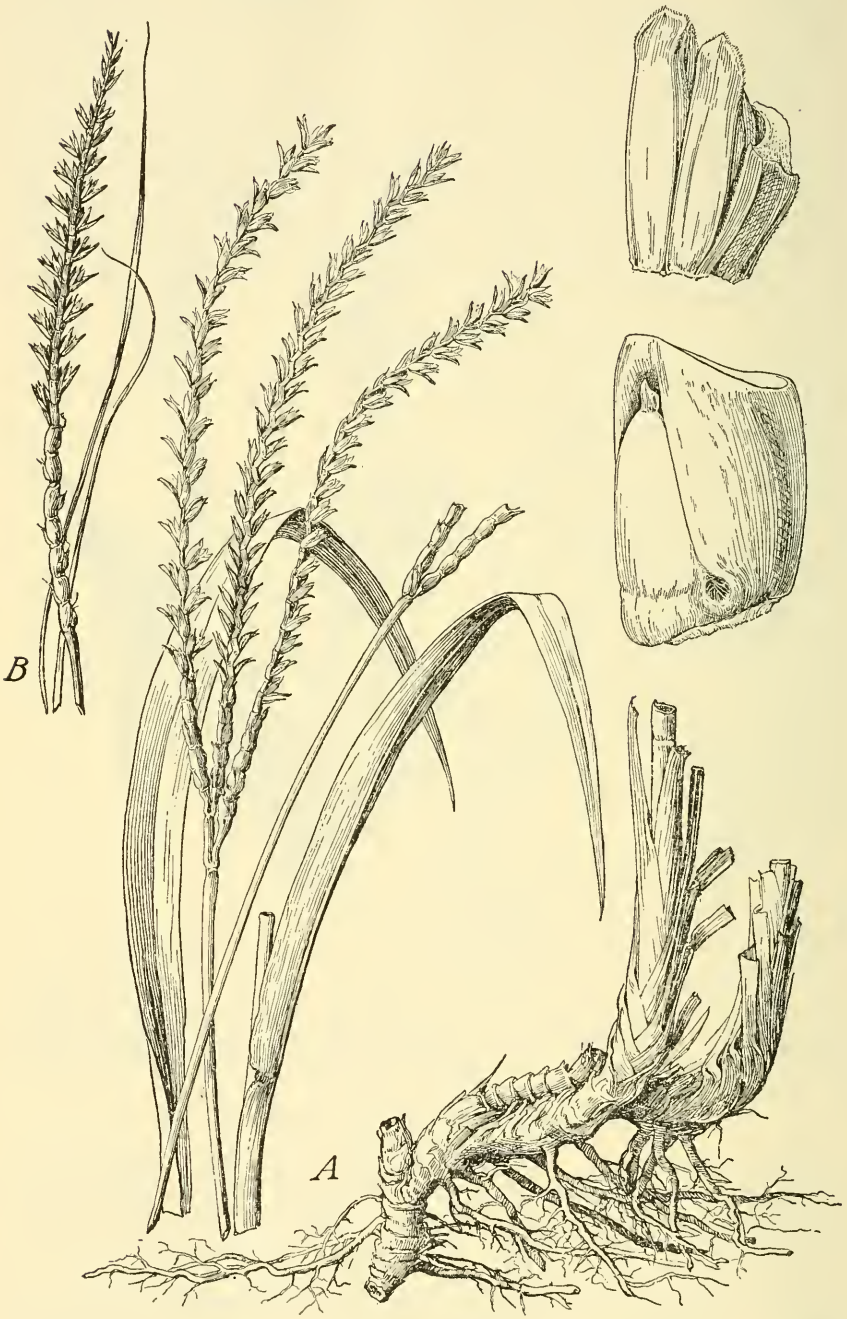

FIGURE 1692.—*A*, *Tripsacum dactyloides*. Plant, × ½; pistillate spikelets with rachis joint and pair of staminate spikelets with rachis joint, × 5. (Amer. Gr. Nat. Herb. 229, Va.) *B*, *T. floridanum*, × 1. (Hitchcock 686, Fla.)

but smaller, infolding the remainder of the spikelet; sterile lemma, fertile lemma, and palea very thin and hyaline, these progressively smaller. Robust perennials, with usually broad flat blades and monoecious terminal and axillary inflorescences of 1 to 3 spikes, the pistillate part below, breaking up into bony, seedlike joints, the staminate above on the same rachis, deciduous as a whole. Type species, *Tripsacum dactyloides*. Name of unknown origin, said by some to come from Greek *tribein*, to rub, alluding to the smooth joints.

The species are good forage grasses, but even the more widely spread *T. dactyloides* is not common enough to be of importance. Two large species not found in the United States, *T. laxum* Nash and *T. latifolium* Hitchc., of Central America, are occasionally cultivated for forage in that region. The genus is of interest because it is related to maize. A hybrid between *T. dactyloides* and maize has recently been made.[10]

Staminate spikelets membranaceous, the members of the pair unequally pediceled, one nearly sessile, the other with a distinct pedicel.
3. T. LANCEOLATUM.

Staminate spikelets rather chartaceous, both members of the pair nearly sessile.
Blades 1 to 2 cm wide, flat; plants 1 to 2 m tall; terminal spikes usually more than one ..... 1. T. DACTYLOIDES.
Blades 1 to 4 mm wide, subinvolute; plants less than 1 m tall; all spikes usually solitary ..... 2. T. FLORIDANUM.

1. Tripsacum dactyloídes (L.) L. EASTERN GAMAGRASS. (Fig. 1692, *A*.) Plants in large clumps, with thick knotty rhizomes, 2 to 3 m tall or sometimes taller, glabrous throughout; blades usually 1 to 2 cm wide, flat, scabrous on the margin; spikes 15 to 25 cm long, the pistillate part one-fourth the entire length or less, the terminal spikes usually 2 or 3, sometimes only 1, those of the branches usually solitary; pistillate spikelets 7 to 10 mm long, the joints rhombic; staminate spikelets 7 to 11 mm long, both of a pair nearly sessile, the glumes rather chartaceous. 2n —Swales, banks of streams, and moist places, Massachusetts to Michigan, Iowa, and Nebraska, south to Florida and Texas; West Indies and Mexico to Brazil (fig. 1693).

FIGURE 1693.—Distribution of *Tripsacum dactyloides*.

2. Tripsacum floridánum Porter. FLORIDA GAMAGRASS. (Fig. 1692, *B*.) Smaller than *T. dactyloides* in all ways, commonly less than 1 m tall; blades mostly 1 to 4 mm wide; terminal and axillary spikes usually solitary (rarely 2 or more). 2n —Low rocky pine lands, southern Florida.

FIGURE 1694.—*Tripsacum lanceolatum*, × 1. (Lemmon, Ariz.)

[10] MANGELSDORF, P. C., and REEVES, R. G. Jour. Hered. 22: 329-343. 1931.

3. Tripsacum lanceolátum Rupr. MEXICAN GAMAGRASS. (Fig. 1694.) Resembling *T. dactyloides;* sheaths, especially the lower, sometimes hispid; blades often hispidulous on the upper surface; spikes more slender with smaller spikelets than in *T. dactyloides*, the terminal spikes usually 3 to 5; staminate spikelets membranaceous, one of the pair distinctly pediceled. ♃ (*T. lemmoni* Vasey.)—Rocky hills, Huachuca Mountains, Ariz.; Mexico to Guatemala.

158. EUCHLAÉNA Schrad. TEOSINTE

Staminate spikelets as in *Zea;* pistillate spikelets solitary on opposite sides, sunken in cavities in the hardened joints of an obliquely articulate rachis, the indurate first glume covering the cavity; second glume membranaceous, the lemma hyaline. Spikes infolded in foliaceous spathes or husks, 2 to several of these together enclosed in the leaf sheaths. Robust annuals and perennials with broad flat blades, terminal panicles of staminate spikelets, and axillary spikes of pistillate spikelets. Type species, *Euchlaena mexicana*. Name from Greek *eu*, well, and *chlaina*, cloak, alluding to the husks hiding the pistillate inflorescence.

1. Euchlaena mexicána Schrad. TEOSINTE. (Fig. 1695.) Tall annual, resembling maize, the culms branching at base, 2 to 3 or even 5 m tall; blades as much as 8 cm wide. ☉ —Occasionally cultivated in the Southern States for green forage; Mexico. Thought to be one of the species from which maize originated (see note under *Zea mays*).

Euchlaena perénnis Hitchc., MEXICAN TEOSINTE, a perennial species from Mexico, is cultivated at the substation of the Agricultural College, Angleton, Tex., and probably at other points. It propagates by creeping rhizomes.

159. ZÉA L.

Spikelets unisexual; staminate spikelets 2-flowered, in pairs, on one side of a continuous rachis, one nearly sessile, the other pedicellate; glumes membranaceous, acute; lemma and palea hyaline; pistillate spikelets sessile, in pairs, consisting of one fertile floret and one sterile floret, the latter sometimes developed as a second fertile floret; glumes broad, rounded or emarginate at apex; sterile and fertile lemmas hyaline, the palea developed; style very long and slender, stigmatic along both sides well toward the base. Robust annual, with terminal panicles (tassels) of staminate racemes, and short-peduncled, pistillate, 8- to many-rowed spikes (ears) enclosed in numerous spathes (husks). Type species, *Zea mays*. Name Greek *zea*, or *zeia*, a kind of grain.

1. Zea máys L. MAIZE, INDIAN CORN. (Fig. 1696.) Tall robust monoecious annual, with overlapping sheaths and broad, conspicuously distichous blades; staminate spikelets in long spike-like racemes, these numerous, forming large spreading terminal panicles; pistillate inflorescence in the axils of the leaves, the spikelets in 8 to 16 or even as many as 30 rows on a thickened, almost woody axis (cob), the whole enclosed in numerous large foliaceous bracts or spathes, the long styles (silk) protruding from the summit as a mass of silky threads; grains at maturity greatly exceeding the glumes. ☉

FIGURE 1695.—*Euchlaena mexicana*. Plant, much reduced; pistillate inflorescence enclosed in bract (*a*) and with portion of bract removed (*b*), × 1; lateral view of rachis joint and fertile spikelet (*c*), and dorsal view of same, showing first glume (*d*), × 2. (Cult.)

FIGURE 1696.—*Zea mays.* Pistillate inflorescence (ear) and 2 branches of staminate inflorescence (tassel), × ½; pair of pistillate spikelets attached to rachis (cob) with mature grains, the second glume showing, × 2; single pistillate spikelet soon after flowering, × 4; staminate spikelet, × 2. (Cult.)

Maize or Indian corn is one of the important economic plants of the world, being cultivated for food for man and domestic animals and for forage. It originated [11] in America, probably on the Mexican Plateau, and was cultivated from prehistoric times by the early races of American aborigines, from Peru to middle North America. Several races of maize are grown in the United States,[12] the most important being dent, the common commercial field sort, flint, sweet, and pop. Pod corn (*Z. mays* var. *tunicáta* Larr.), occasionally cultivated as a curiosity, is a variety in which each kernel is enveloped in the elongate glumes. A variety with variegated leaves (*Z. mays* var. *japónica* Körn.) is cultivated for ornament.

[11] For a note on the origin of maize, see COLLINS, G. N. THE ORIGIN OF MAIZE. Jour. Wash. Acad. Sci. 2: 520–530. 1912.

[12] See the following publications: MONTGOMERY, E. G. THE CORN CROPS, A DISCUSSION OF MAIZE, KAFIRS, AND SORGHUMS AS GROWN IN THE UNITED STATES AND CANADA. 347 pp., illus. New York. 1913.
STURTEVANT, E. L. VARIETIES OF CORN. U.S.Dept.Agr., Off. Expt. Stas. Bull. 57, 108 pp. 1899.

SYNONYMY

The following names have appeared in American botanical literature as applied to grasses growing in the United States. For grasses introduced into the United States from other countries there are here given only the names appearing in American works. No attempt has been made to present the complex synonymy for these introduced grasses given in foreign works. The synonymy for the generic names will be found in The Genera of Grasses of the United States.[13]

For quick reference the names of genera and valid species are arranged in alphabetic order, the names in blackface type. The synonyms, in italics, are arranged chronologically under the names to which they are referred. The numbers in parentheses are the numbers these genera and species bear in the body of this work.

(41) AEGILOPS L.

(1) **Aegilops cylindrica** Host, Icon. Gram. Austr. 2: 6. pl. 7. 1802. Southern Europe.
Triticum cylindricum Ces., Pass. and Gib., Comp. Fl. Ital. 86. 1867. Presumably based on *Aegilops cylindrica* Host.

(3) **Aegilops ovata** L., Sp. Pl. 1050. 1753. Southern Europe.
Triticum ovatum Raspail, Ann. Sci. Nat., Bot. 5: 435. 1825. Based on *A. ovata* L.

(2) **Aegilops triuncialis** L., Sp. Pl. 1051. 1753. Mediterranean region.
Triticum triunciale Raspail, Ann. Sci. Nat., Bot. 5: 435. 1825. Based on *A. triuncialis* L.

(89) AEGOPOGON Humb. and Bonpl.

(1) **Aegopogon tenellus** (DC.) Trin., Gram. Unifl. 164. 1824. Based on *Lamarckia tenella* DC., though Trinius cites not that but *A. pusillus* Beauv., in Roem. and Schult., Syst. Veg. 2: 805. 1817. Roemer and Schultes cite *L. tenella* DC., obviously the basis of Trinius' name, as synonym of *A. pusillus* Beauv., which, however, is the same as *A. cenchroides* Humb. and Bonpl. (not known from the U.S.).
Lamarckia tenella DC., Cat. Hort. Monsp. 120. 1813. Grown in Montpellier, origin unknown, probably Mexico.
Cynosurus tenellus Cav.; DC., Cat. Hort. Monsp. 120. 1813, as synonym of *Lamarckia tenella* DC.
Hymenothecium unisetum Lag., Gen. and Sp. Nov. 4. 1816. Grown from Mexican seed sent by Sessé.
Hymenothecium tenellum Lag., Gen. and Sp. Nov. 4. 1816. Based on *Cynosurus tenellus* Cav.
Aegopogon unisetus Roem. and Schult., Syst. Veg. 2: 805. 1817. Based on *Hymenothecium unisetum* Lag.
Schellingia tenera Steud., Flora 33: 232. 1850. Mexico, *Galeotti* 5750.
Aegopogon geminiflorus var. *unisetus* Fourn., Mex. Pl. 2: 71. 1886. Based on *A. unisetus* Roem. and Schult.

(39) AGROPYRON[14] Gaertn.

(9) **Agropyron albicans** Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 32. 1897. Yogo Gulch, Mont., *Rydberg* 3405.

(4) **Agropyron arenicola** Davy, in Jepson, Fl. West. Mid. Calif. 76. 1901. Point Reyes, Calif., *Davy* 6879.

[13] Hitchcock, A. S. The genera of grasses of the United States, with special reference to the economic species. U.S.Dept.Agr. Bull. 772, 307 pp. illus. 1920.

[14] Spelled also *Agropyrum* and *Agriopyrum*.

(20) **Agropyron arizonicum** Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 27. 1897. New Mexico, Arizona [type, Rincon Mountains, *Nealley* 67], and Chihuahua, Mexico.

Agropyron caninum var. *majus* Scribn., Bull. Torrey Bot. Club 10: 32. 1883. Santa Rita Mountains, Ariz., *Pringle*.

Agropyron spicatum var. *arizonicum* Jones, Contrib. West. Bot. 14: 19. 1912. Based on *A. arizonicum* Scribn. and Smith.

(15) **Agropyron bakeri** E. Nels., Bot. Gaz. 38: 378. 1904. Pagosa Peak, Colo., *Baker* 139.

Agropyron caninum (L.) Beauv., Ess. Agrost. 102, 146. 1812. Based on *Triticum caninum* L.

Triticum caninum L., Sp. Pl. 86. 1753. Europe.

Zeia canina Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Triticum caninum* L.

(1) **Agropyron cristatum** (L.) Gaertn., Nov. Comm. Petrop. 14: 540. 1770. Based on *Bromus cristatus* L.

Bromus cristatus L., Sp. Pl. 78. 1753. Northern Asia.

Triticum cristatum Schreb., Beschr. Gräs. 2: 12. pl. 23. f. 2. 1769. Based on *Bromus cristatus* L.

Avena cristata Roem. and Schult., Syst. Veg. 2: 758. 1817, as synonym of *Agropyron cristatum* Gaertn.

Costia cristata Willk., Bot. Ztg. 16: 377. 1858. Based on *Bromus cristatus* L.

Zeia cristata Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron cristatum* Gaertn.

(6) **Agropyron dasystachyum** (Hook.) Scribn., Bull. Torrey Bot. Club 10: 78. 1883. Based on *Triticum repens* var. *dasystachyum* Hook.

Triticum repens var. *dasystachyum* Hook., Fl. Bor. Amer. 2: 254. 1840. Saskatchewan, *Richardson*. The type has villous lemmas.

Triticum repens var. *subvillosum* Hook., Fl. Bor. Amer. 2: 254. 1840. Mackenzie River, Canada, *Richardson*. The type has scabrous-pubescent lemmas.

Triticum dasystachyum A. Gray, Man. 602. 1848. Based on *T. repens* var. *dasystachyum* Hook.

Agropyron dasystachyum subvillosum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 33. 1897. Based on *Triticum repens* var. *subvillosum* Hook.

Agropyron lanceolatum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 34. 1897. Idaho [type, Blackfoot, *Palmer* 266], Washington and Oregon.

Triticum repens acutum Vasey; Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 34. 1897, as synonym of *A. lanceolatum* Scribn. and Smith.

Agropyron subvillosum E. Nels., Bot. Gaz. 38: 378. 1904. Based on *Triticum repens* var. *subvillosum* Hook.

Zeia dasystachya Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Triticum repens* var. *dasystachyum* Hook.

(7) **Agropyron elmeri** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 54. pl. 12. 1898. Snake River, Wash., *Elmer* 759.

(10) **Agropyron griffithsi** Scribn. and Smith; Piper, Biol. Soc. Wash. Proc. 18: 148. 1905. North Fork Clear River, Wyo., *Williams* and *Griffiths* 140.

(19) **Agropyron inerme** (Scribn. and Smith) Rydb., Bull. Torrey Bot. Club 36: 539. 1909. Based on *A. divergens inerme* Scribn. and Smith.

Agropyron divergens inerme Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 27. 1897. British Columbia to Utah and Idaho [type *Henderson* 3058].

Agropyron spicatum inerme Heller, Cat. N.Amer. Pl. ed. 2. 3. 1900. Based on *Agropyron divergens inerme* Scribn. and Smith.

Agropyron intermedium (Host) Beauv., Ess. Agrost. 102, 146. 1812. Based on *Triticum intermedium* Host.

Triticum intermedium Host, Gram. Austr. 3: 23. 1805. Austria.

Triticum glaucum Desf.; DC., Fl. Franc. 5: 281. 1815. Not *T. glaucum* Moench, 1794. France.

Agropyron glaucum Roem. and Schult., Syst. Veg. 2: 752. 1817. Based on *Triticum glaucum* Desf.

Braconotia glauca Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum glaucum* Desf.

Agropyron repens glaucum Scribn., Mem. Torrey Bot. Club 5: 57. 1894. Based on *Triticum glaucum* Desf., but misapplied to *A. smithii* Rydb.

Zeia glauca Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Triticum glaucum* Desf., but misapplied to *A. smithii* Rydb.

Agropyron japonicum Tracy, U.S.Dept.Agr., Div. Bot. Ann. Rept. 6. 1891, name only. Vasey; Wickson, Calif. Agr. Expt. Sta. Rept. 1895–1897: 275. pl. 14. f. 1. 1898. Name only. "A California-grown specimen", from New Zealand seed, said to have been sent to Dr. Vasey cannot be found in the U.S. National Herbarium. The plate seems to represent *Brachypodium japonicum* Miquel.

Agropyron junceum (L.) Beauv., Ess. Agrost. 102, 146, 180. 1812. Based on *Triticum junceum* L.

Triticum junceum L., Mant. Pl. 2: 327. 1771. Europe.

Festuca juncea Moench, Meth. Pl. 190. 1794. Based on *Triticum junceum* L.

Braconotia juncea Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum junceum* L.

The names *Agropyron junceum* and *A. intermedium* are here applied in accord with Ascherson and Graebner (Syn. Mitteleur. Fl. 2: 654, 662. 1901) under *Triticum*. *Triticum junceum* L. (Cent. Pl. 1: 6. 1755; Amoen. Acad. 4: 266. 1759) which seems to have been generally ignored, appears to be the same as *T. intermedium* Host. Linnaeus later (Mant. Pl. 2: 327. 1771) published a different species under the same name. This second name is the one used by Ascherson and Graebner and other European botanists. The problem involves study of European types not here available.

(14) **Agropyron latiglume** (Scribn. and Smith) Rydb., Bull. Torrey Bot. Club 36: 539. 1909. Based on *A. violaceum latiglume* Scribn. and Smith.

Agropyron violaceum latiglume Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 30. 1897. Montana [type, Lone Mountain, Gallatin County, *Tweedy* 1011] to Alaska.

Agropyron biflorum latiglume Piper, Bull. Torrey Bot. Club 32: 547. 1905. Based on *A. violaceum latiglume* Scribn. and Smith.

Agropyron caninum var. *latiglume* Pease and Moore, Rhodora 12: 73. 1910. Based on *A. violaceum* var. *latiglume* Scribn. and Smith.

(21) **Agropyron parishii** Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 28. 1897. San Bernardino Mountains, Calif., *Parish* 2054.

AGROPYRON PARISHII VAR. LAEVE Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 28. 1897. Cuyamaca Mountains, Calif., *Palmer* 414. (Published as *A. parishii laeve*.)

Agropyron laeve Hitchc., in Jepson, Fl. Calif. 1: 181. 1912. Based on *A. parishii laeve* Scribn. and Smith.

(13) **Agropyron pauciflorum** (Schwein.) Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *Triticum pauciflorum* Schwein. [*Agropyron pauciflorum* Schur, 1859, cited as synonym of *A. caninum* Roem. and Schult., has never been validly published, hence Schweinitz's name must be taken up.]

Triticum pauciflorum Schwein., in Keat., Narr. Exped. St. Peter's River 2: 383. 1824. Prairies of the St. Peter [Minn.], *Say* in 1823.

Triticum missuricum Spreng., Syst. Veg. 1: 325. 1825. Missouri River. *Festuca spicata* Pursh erroneously cited as synonym. The type has not been found. A specimen of *Agropyron pauciflorum* in the Vienna Herbarium, collected by Geyer, "Missouri" in 1839, is labeled *T. missuricum* Spreng. There are no rhizomes. Sprengel's description is inadequate, but applies to *A. pauciflorum*. *Triticum repens* and other species having rhizomes are described as having "radice repente" while *T. missuricum* is not so described.

Triticum trachycaulum Link, Hort. Berol. 2: 189. 1833. Grown from seed collected by *Richardson* in North America.

Agropyron trachycaulon Steud., Syn. Pl. Glum. 1: 344. 1854. Garden name as synonym of *Triticum trachycaulum* Link.

Crithopyrum trachycaulon Steud., Syn. Pl. Glum. 1: 344. 1854. Garden name, as synonym of *Triticum trachycaulum* Link.

Agropyron tenerum Vasey, Bot. Gaz. 10: 258. 1885. Rocky Mountains. [Type, Fort Garland, Colo., *Vasey* in 1884.]

Agropyron violaceum var. *major* Vasey, Contrib. U.S.Natl.Herb. 1: 280. 1893. Oregon, *Cusick* 1134.

Agropyron repens var. *tenerum* Beal, Grasses, N.Amer. 2: 637. 1896. Based on *A. tenerum* Vasey.

Agropyron tenerum longifolium Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 30. 1897. Oregon, Giant's [error for Grant's] Pass, *Howell* 256.

Agropyron tenerum ciliatum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost Bull. 4: 30. 1897. Minnesota [type, Duluth, *Vasey* in 1881] to Nebraska and Utah.

Agropyron novae-angliae Scribn., in Brain., Jones, and Eggl., Fl. Vt. 103. 1900. Westmore, Vt., *Grout* and *Eggleston* in 1894.

Agropyron tenerum majus Piper, Bull. Torrey Bot. Club 32: 543. 1905. Based on *A. violaceum* var. *major* Vasey.

Agropyron tenerum trichocoleum Piper, Bull. Torrey Bot. Club 32: 546. 1905. Based on *A. tenerum ciliatum* Scribn. and Smith.

Agropyron caninum var. *tenerum* Pease and Moore, Rhodora 12: 71. 1910. Based on *A. tenerum* Vasey.

Agropyron caninum var. *tenerum* forma *ciliatum* Pease and Moore, Rhodora 12: 72. 1910. Based on *A. tenerum ciliatum* Scribn. and Smith.

Agropyron caninum var. *tenerum* forma *fernaldii* Pease and Moore, Rhodora 12: 73. 1910. Quebec, *Macoun* Herb. Geol. Surv. Canada 63978.

Agropyron caninum var. *hornemanni* forma *pilosifolium* Pease and Moore, Rhodora 12: 75. 1910. Dead River, Maine, *Fernald* 576.

Zeia tenera Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron tenerum* Vasey.

Agropyron tenerum var. *novae-angliae* Farwell, Mich. Acad. Sci. Rept. 21: 355. 1920. Based on *A. novae-angliae* Scribn.

Agropyron missuricum Farwell, Amer. Midl. Nat. 12: 48. 1930. Based on *Triticum missuricum* Spreng.

Agropyron trachycaulum Malte, Ann. Rept. Natl. Mus. Canada 1930: 42. 1932. Based on *Triticum trachycaulum* Link.

Agropyron trachycaulum var. *tenerum* Malte, Ann. Rept. Natl. Mus. Canada 1930: 44. 1932. Based on *A. tenerum* Vasey.

Agropyron trachycaulum var. *glaucescens* Malte, Ann. Rept. Natl. Mus. Canada 1930: 45. 1932. Saskatchewan, *Malte.*

Agropyron trachycaulum var. *trichocoleum* Malte, Ann. Rept. Natl. Mus. Canada 1930: 45. 1932. Based on *A. tenerum trichocoleum* Piper.

Agropyron trachycaulum var. *fernaldii* Malte, Ann. Rept. Natl. Mus. Canada 1930: 46. 1932. Based on *A. caninum* var. *tenerum* forma *fernaldii* Pease and Moore.

Agropyron trachycaulum var. *majus* Fernald, Rhodora 35: 171. 1933. Based on *A. violaceum* var. *major* Vasey.

Agropyron trachycaulum var. *novae-angliae* Fernald, Rhodora 35: 174. 1933. Based on *A. novae-angliae* Scribn.

Alpine forms of this species have been referred to *Agropyron violaceum* (Hornem.) Lange and to *A. biflorum* (Brign.) Roem. and Schult.

(16) **Agropyron pringlei** (Scribn. and Smith) Hitchc., in Jepson, Fl. Calif. 1: 183. 1912. Based on *A. gmelini pringlei* Scribn. and Smith.

Agropyron gmelini[15] *pringlei* Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 31. 1897. Wyoming and California [type, Summit Valley, *Pringle* in 1882].

Agropyron caninum var. *gmelini* forma *pringlei* Pease and Moore, Rhodora 12: 76. 1910. Based on *A. gmelini pringlei* Scribn and Smith.

Agropyron spicatum var. *pringlei* Jones, Contrib. West. Bot. 14: 19. 1912. Based on *A. gmelini pringlei* Scribn. and Smith.

Agropyron pseudorepens Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 34. 1897. Texas and Arizona to Nebraska [type, Kearney, *Rydberg* 2018], Montana and British Columbia.

Agropyron pseudorepens magnum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 35. 1897. Enterprise, Colo., *Rydberg* 2401.

Agropyron tenerum magnum Piper, Bull. Torrey Bot. Club 32: 546. 1905. Based on *A. pseudorepens magnum* Scribn. and Smith.

Agropyron tenerum var. *pseudorepens* Jones, Contrib. West. Bot. 14: 19. 1912. Based on *A. pseudorepens* Scribn. and Smith.

Zeia pseudorepens Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron pseudorepens* Scribn. and Smith.

(3) **Agropyron pungens** (Pers.) Roem. and Schult., Syst. Veg. 2: 753. 1817. Based on *Triticum pungens* Pers.

Triticum pungens Pers., Syn. Pl. 1: 109. 1805. England.

Triticum repens var. *pungens* Duby, in DC., Bot. Gall. 1: 529. 1828. Based on *T. pungens* Pers.

Braconotia pungens Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum pungens* Pers.

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[15] *Triticum caninum* var. *gmelini* Griseb., in Ledeb., Icon. Pl. Ross. 3: 16. pl. 248. 1831, the basis of *Agropyron gmelini* Scribn. and Smith, U.S. Dept. Agr., Div. Agrost. Bull. 4: 30. 1897, and of *A. caninum* var. *gmelini* Pease and Moore, Rhodora 12: 75. 1910, is a Siberian species not known from North America. See note under *A. subsecundum.*

Agropyron repens subsp. *pungens* Hook. f., Stud. Fl. ed. 3: 504. 1884. Based on *A. pungens* Roem. and Schult.

Agropyron tetrastachys Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 32. 1897. Cape Elizabeth, Maine, *Scribner* in 1895.

(2) **Agropyron repens** (L.) Beauv., Ess. Agrost. 102, 146, 180. pl. 20, f. 2. 1812. Based on *Triticum repens* L.

Triticum repens L., Sp. Pl. 86. 1753. Europe.

Triticum infestum Salisb., Prodr. Stirp. 27. 1796. Based on *T. repens* L.

?*Triticum vaillantianum* Wulf. and Schreb., in Schweig. and Körte, Spec. Fl. Erland. 1: 143. 1804. Germany. [This work not in Washington. From the description in ed. 2. 1: 143. 1811, this appears to be an awned form of *A. repens*.]

Braconotia officinarum Godr., Fl. Lorr. 3: 192. 1844. Based on *Triticum repens* L.

Agropyron repens var. *pilosum* Scribn., in Rand and Redfield, Fl. Mt. Desert 183. 1894. Mount Desert, Maine, *Rand*.

Agropyron repens forma *geniculatum* Farwell, Ann. Rept. Commr. Parks and Boul. Detroit 11: 48. 1900. Detroit, Mich., *Farwell* 1635.

Agropyron repens forma *stoloniferum* Farwell, Ann. Rept. Commr. Parks and Boul. Detroit 11: 48. 1900. Detroit, *Farwell* 1634.

Zeia repens Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Triticum repens* L.

Agropyron repens forma *pilosum* Fernald, Rhodora 35: 184. 1933. Based on *A. repens* var. *pilosum* Scribn.

Agropyron repens var. *subulatum* forma *heberhachis* Fernald, Rhodora 35: 184. 1933. Yarmouth, Nova Scotia, *Long* and *Linder* 20,091.

Agropyron repens var. *subulatum* forma *setiferum* Fernald, Rhodora 35: 184. 1933. Chelsea Beach, Mass., *Boott* in 1868.

?*Agropyron repens* var. *subulatum* forma *vaillantianum* Fernald, Rhodora 35: 184. 1933. Based on *Triticum vaillantianum* Wulf. and Schreb.

Agropyron leersianum (Wulf.) Rydb. (Brittonia 1: 85. 1931), based on "*Triticum repens leersianum* Wulfen" (apparently error for *T. leersianum* Wulf.) is applied to awned specimens of *A. repens*. The name, ultimately based on a description and figure named "*Elymus caninus* L." by Leers (Fl. Herborn. 46. pl. 12. f. 4. 1775), is uncertain. The figure, showing paired spikelets, appears to represent a species of *Elymus*.

(8) **Agropyron riparium** Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 35. 1897. Montana [type, Garrison, *Rydberg* 2127].

Agropyron smithii var. *riparium* Jones, Contrib. West. Bot. 14: 19. 1912. Based on *A. riparium* Scribn. and Smith.

Zeia riparia Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron riparium* Scribn. and Smith.

(23) **Agropyron saundersii** (Vasey) Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Based on *Elymus saundersii* Vasey.

Elymus saundersii Vasey, Bull. Torrey Bot. Club 11: 126. 1884. Veta Pass, Colo. [*Vasey*].

(22) **Agropyron saxicola** (Scribn. and Smith) Piper, Contrib. U.S. Natl. Herb. 11:148. 1906. Based on *Elymus saxicola* Scribn. and Smith.

Elymus saxicola Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 11: 56. pl. 15. 1898. Mt. Chapaca, Wash., *Elmer* 554.

Sitanion flexuosum Piper, Erythea 7: 99. 1899. Wawawai, Wash., *Piper* 3004.

Sitanion lanceolatum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 20. 1899. Barker, Mont., *Rydberg* 3381.

Agropyron flexuosum Piper, Biol. Soc. Wash. Proc. 18: 149. 1905. Based on *Sitanion flexuosum* Piper.

Agropyron sitanioides J. G. Smith; Piper, Biol. Soc. Wash. Proc. 18: 149. 1905. Rapid City, S.Dak., *Griffiths* 735.

(17) **Agropyron scribneri** Vasey, Bull. Torrey Bot. Club 10: 128. 1893. Montana, *Scribner* in 1883.

Elymus scribneri Jones, Contrib. West. Bot. 14: 20. 1912. Based on *Agropyron scribneri* Vasey.

Agropyron semicostatum (Steud.) Nees; Boiss., Fl. Orient. 5: 662. 1884. Presumably based on *Triticum semicostatum* Steud.

Triticum semicostatum Steud., Syn. Pl. Glum. 1: 346. 1854. Nepal.

(5) **Agropyron smithii** Rydb., Mem. N.Y. Bot. Gard. 1: 64. 1900. (Feb.) Based on *A. spicatum* as described by Scribner and Smith (U.S.Dept.Agr., Div. Agrost. Bull. 4: 33. 1897), ["type * * * *Geyer*, upper Missouri"], not *Festuca spicata* Pursh, upon which they based the name.

Agropyron glaucum occidentale Scribn., Trans. Kans. Acad. 9: 119. 1885. Kansas. Scribner later (Mem. Torrey Bot. Club 5: 57. 1894) called this *A. repens glaucum*, but he based that name on *Triticum glaucum* Desf.

Agropyron occidentale Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 27: 9. 1900. (Dec.) Based on *A. glaucum occidentale* Scribn.

Zeia occidentalis Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron occidentale* Scribn.

Zeia smithii Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron smithii* Rydb.

Agropyron spicatum var. *viride* Farwell, Mich. Acad. Sci. Rept. 21: 356. 1920. Detroit, Mich., *Farwell* 851e.

AGROPYRON SMITHII var. MOLLE Jones, Contrib. West. Bot. 14: 18. 1912. Based on *A. spicatum molle* Scribn. and Smith.

Agropyron spicatum molle Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 33. 1897. Saskatchewan to Colorado, New Mexico, Idaho, and Washington. [Type, Montana, *Rydberg* 3193.]

Agropyron molle Rydb., Mem. N.Y. Bot. Gard. 1: 65. 1900. Based on *A. spicatum molle* Scribn. and Smith.

Agropyron occidentale molle Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 27: 9. 1900. Based on *A. spicatum molle* Scribn. and Smith.

Zeia mollis Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on *Agropyron spicatum molle* Scribn. and Smith.

AGROPYRON SMITHII var. PALMERI Heller, Cat. N.Amer. Pl. ed. 2: 3. 1900. Based on *A. spicatum palmeri* Scribn. and Smith. (Published as *A. smithii palmeri*.)

Agropyron spicatum palmeri Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 33. 1897. Arizona [type, *Palmer* in 1869] and New Mexico.

Agropyron occidentale palmeri Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 27:9. 1900. Based on *A. spicatum palmeri* Scribn. and Smith.

Agropyron palmeri Rydb., Colo. Agr. Expt. Sta. Bull. 100: 55. 1906. Based on *A. spicatum palmeri* Scribn. and Smith.

(18) **Agropyron spicatum** (Pursh) Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 33. 1897. Based on *Festuca spicata* Pursh, but due to misidentification of Pursh's species, misapplied to *Agropyron smithii* Rydb.

Festuca spicata Pursh, Fl. Amer. Sept. 1: 83. 1814. Missouri and Columbia Rivers [type from Columbia River, *Lewis* and *Clarke* in 1806].

Schedonorus spicatus Roem. and Schult., Syst. Veg. 2: 707. 1817. Based on *Festuca spicata* Pursh.

Triticum divergens Nees; Steud., Syn. Pl. Glum. 1: 347. 1854. North America, *Douglas*.

Agropyron divergens Nees; Vasey, Descr. Cat. Grasses U.S. 96. 1885. Presumably based on *Triticum divergens* Nees.

Agropyron divergens var. *tenue* Vasey, Descr. Cat. Grasses U.S. 96. 1885. Name only; in Macoun, Cat. Can. Pl. 2^1: 242. 1888. Name only.

Agropyron divergens tenuispicum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 27. 1897. Washington and Oregon [type, *Howell* 181] to Wyoming and Montana.

Agropyron vaseyi Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 27. 1897. Oregon and Washington to Wyoming and Colorado. [Type, Montana, *Rydberg* 2299.]

Agropyron spicatum tenuispicum Rydb., Mem. N.Y. Bot. Gard. 1: 61. 1900. Based on *A. divergens tenuispicum* Scribn. and Smith.

Agropyron spicatum var. *vaseyi* E. Nels., Bot. Gaz. 38: 378. 1904. Based on *A. vaseyi* Scribn. and Smith.

Zeia spicata Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Festuca spicata* Pursh.

This is the species called *Triticum strigosum* Less., by Thurber (S. Wats. Bot. Calif. 2: 324. 1880), and *Agropyron strigosum* by Coulter (Man. Rocky Mount. 426. 1885, the name erroneously ascribed to Beauv.). Not *T. strigosum* Less., of the Caspian region, nor *A. strigosum* (Bieb.) Boiss. (1884) of Asia Minor.

AGROPYRON SPICATUM var. PUBESCENS Elmer, Bot. Gaz. 36: 52. 1903. Mount Stuart, Wash., *Elmer* 1158. (Published as *A. spicatum pubescens*.)

Agropyron spicatum puberulentum Piper, Contrib. U.S. Natl. Herb. 11: 147. 1906. Based on *Agropyron spicatum pubescens* Elmer.

(12) **Agropyron subsecundum** (Link) Hitchc., Amer. Jour. Bot. 21: 131. 1934. Based on *Triticum subsecundum* Link.

Triticum subsecundum Link, Hort. Berol. 2: 190. 1833. Garden plant, seed collected by Richardson in western North America.

Triticum richardsoni Schrad., Linnaea 12: 467. 1838. North America.

Agropyron richardsoni Schrad., Linnaea 12: 467. 1838, as synonym of *Triticum richardsoni* Schrad.

Cryptopyrum richardsoni Heynh., Nom. 2: 174. 1846, as synonym of *Triticum richardsoni* Schrad.

Agropyron unilaterale Cassidy, Colo. Agr. Expt. Sta. Bull. 12: 63. 1890. Not *A. unilaterale* Beauv., 1812. Colorado.

Agropyron caninum var. *unilaterale* Vasey, Contrib. U.S. Natl. Herb. 1: 279. 1893. Based on *A. unilaterale* Cassidy, though Vasey adds: "Type specimen collected by F. Lamson-Scribner in Montana in 1883 (no. 422)."

Agropyron violaceum forma *caninoides* Ramaley, Minn. Bot. Studies 1: 108. 1894. Minnesota, *Macmillan* and *Sheldon* 84.

Agropyron caninum forma *violacescens* Ramaley, Minn. Bot. Studies 1: 107. 1894. Based on *A. caninum* var. *unilaterale* Vasey.

Agropyron violacescens Beal, Grasses N.Amer. 2: 635. 1896. Based on *A. caninum* forma *violacescens* Pound (error for Ramaley).

Agropyron caninoides Beal, Grasses N.Amer. 2: 640. 1896. Based on *A. violaceum* forma *caninoides* Ramaley.

Agropyron caninum pubescens Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 29. 1897. British Columbia, *Macoun* 99.

Agropyron richardsoni ciliatum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 29. 1897. Montana, Belt Mountains, *Scribner* in 1883.

Agropyron caninum forma *glaucum* Pease and Moore, Rhodora 12: 71. 1910. Maine, *Fernald* 1367.

Agropyron caninum var. *unilaterale* forma *ciliatum* Pease and Moore, Rhodora 12: 76. 1910. Based on *A. richardsoni ciliatum* Scribn. and Smith.

Agropyron caninum var. *richardsoni* Jones, Contrib. West. Bot. 14: 18. 1912. Based on *Triticum richardsoni* "Trin." (error for Schrad.).

Zcia richardsoni Lunell, Amer. Midl. Nat. 4: 227. 1915. Based on *Agropyron richardsoni* Schrad.

Agropyron trachycaulum var. *unilaterale* Malte, Ann. Rept. Natl. Mus. Canada 1930: 46. 1932. Based on *A. unilaterale* Cassidy.

Agropyron trachycaulum var. *ciliatum* Malte, Ann. Rept. Natl. Mus. Canada 1930: 47. 1932. Based on *A. richardsoni ciliatum* Scribn. and Smith.

Agropyron trachycaulum var. *caerulescens* Malte, Ann. Rept. Natl. Mus. Canada 1930: 47. 1932. Vancouver Island, *Malte.*

Agropyron trachycaulum var. *glaucum* Malte, Ann. Rept. Natl. Mus. Canada 1930: 47. 1932. Based on *A. caninum* forma *glaucum* Pease and Moore.

Agropyron trachycaulum var. *pilosiglume* Malte, Ann. Rept. Natl. Mus. Canada 1930: 48. 1932. Victoria, Vancouver Island, *Malte.*

Agropyron trachycaulum var. *hirsutum* Malte, Ann. Rept. Natl. Mus. Canada 1930: 48. 1932. Victoria, Vancouver Island, *Macoun.*

This is the species which has been generally called *Agropyron caninum* (L.) Beauv. by American authors. Most of the specimens cited under *A. gmelini* Scribn. and Smith (U.S.Dept.Agr., Div. Agrost. Bull. 4: 30. 1897) belong to *A. subsecundum*, but the name was based on *Triticum caninum* var. *gmelini* Griseb., a Siberian species.

AGROPYRON SUBSECUNDUM var. ANDINUM (Scribn. and Smith) Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *A. violaceum andinum* Scribn. and Smith.

Agropyron violaceum andinum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 30. 1897. Colorado. [Type, Grays Peak, *Jones* 720.]

Agropyron brevifolium Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 55. pl. 13. 1898. Washington, *Elmer* 676.

Agropyron biflorum andinum Piper, Bull. Torrey Bot. Club 32: 547. 1905. Based on *A. violaceum andinum* Scribn. and Smith.

Agropyron andinum Rydb., Colo. Agr. Expt. Sta. Bull. 100: 54. 1906. Based on *A. violaceum andinum* Scribn. and Smith.

Agropyron caninum var. *andinum* Pease and Moore, Rhodora 12: 75. 1910. Based on *A. violaceum andinum* Scribn. and Smith.

Agropyron trichophorum (Link) Richt., Pl. Eur. 1: 124. 1890. Based on *Triticum trichophorum* Link.

Triticum trichophorum Link, Linnaea 17: 395. 1843. Europe.

Agropyron triticeum Gaertn., Nov. Comm. Petrop. 14[1]: 540. 1770. Russia.
Secale prostratum Pall., Reise Prov. Russ. Reich. Anhang 1: 485. 1771. Russia.
Triticum prostratum L. f., Suppl. Pl. 114. 1781. Based on *Secale prostratum* Pall.
Agropyron prostratum Beauv., Ess. Agrost. 102, 146. 1812. Based on *Triticum prostratum* L. f.
(11) **Agropyron vulpinum** (Rydb.) Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *Elymus vulpinus* Rydb.
Elymus vulpinus Rydb., Bull. Torrey Bot. Club 36: 540. 1909. Grant County, Nebr., *Rydberg* 1617.
Agropyron richardsoni vulpinus Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Based on *Elymus vulpinus* Rydb.

(64) AGROSTIS L.

(5) **Agrostis aequivalvis** (Trin.) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 362. 1841. Based on *A. canina* var. *aequivalvis* Trin.
Agrostis canina var. *aequivalvis* Trin., in Bong., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 171. 1832. Sitka, Alaska.
Deyeuxia aequivalvis Benth.; Vasey, Contrib. U.S.Natl. Herb. 3: 77. 1892, as synonym of *Agrostis aequivalvis* Trin.; Jacks., Ind. Kew. 2: 740. 1893. Based on *A. aequivalvis* Trin. (as indicated by the reference to Benth., Jour. Linn. Soc. Bot. 19: 91. 1881, the combination not there made).
Podagrostis aequivalvis Scribn. and Merr., Contrib. U.S.Natl.Herb. 13: 58. 1910. Based on *Agrostis canina* var. *aequivalvis* Trin.
(10) **Agrostis alba** L., Sp. Pl. 63. 1753; ed. 2. 1: 93. 1762. Europe. Linnaeus' diagnosis is inadequate and his original application of the name is uncertain, but the specimen in his herbarium bearing the name in his own script belongs to the species for which the name has been generally used by European and American authors ever since. In recent American works this species has been called *A. palustris* Huds. But this name proves to belong to the creeping species with contracted panicle, the same as *A. maritima* Lam. See U.S.Dept.Agr., Bur. Plant Indus. Bull. 68: 25. 1905, and U.S. Dept. Agr. Bull. 772: 128. 1920, for discussion of *A. alba* L. In the second edition of the Species Plantarum an undoubted reference to this species is added to the original uncertain one.
Agrostis dispar Michx., Fl. Bor. Amer. 1: 52. 1803. South Carolina.
Decandolia alba Bast., Fl. Maine-et-Loire 29. 1809. Based on *Agrostis alba* L.
Vilfa alba Beauv., Ess. Agrost. 16, 146, 181. 1812. Based on *Agrostis alba* L.
Vilfa dispar Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis dispar* Michx.
Agrostis alba var. *maior* Gaudin, Fl. Helv. 1: 189. 1828. Switzerland.
Agrostis alba var. *dispar* Wood, Class-book 774. 1861. Based on *A. dispar* Michx.
Agrestis alba Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Agrostis alba* L.
Agrostis stolonifera var. *major* Farwell, Mich. Acad. Sci. Rept. 21: 351. 1920. Based on *A. alba* var. *major* Gaudin.
Agrostis stolonifera forma *aristigera* Fernald, Rhodora 35: 317. 1933. Granville, Mass., *Seymour*.
(27) **Agrostis bakeri** Rydb., Bull. Torrey Bot. Club 36: 532. 1909. Pagosa Peak, Colo., *Baker* 150.
(20) **Agrostis blasdalei** Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Fort Bragg, Calif., *Davy* and *Blasdale* 6159.
(31) **Agrostis borealis** Hartm., Handb. Skand. Fl. ed. 3. 77. 1838. Lapland.
?*Agrostis rubra* L., Sp. Pl. 62. 1753. Sweden. Identity uncertain.
Agrostis canina var. *alpina* Oakes, Cat. Vt. Pl. 32. 1842. Name only. Camels Hump Mountain, Vt., *Robbins, Tuckerman*, and *Macrae*.
Agrostis canina var. *tenella* Torr., Fl. N.Y. 2: 443. 1843. Northern New York.
Agrostis pickeringii Tuckerm., Mag. Hort. Hovey 9: 143. 1843. White Mountains, N.H.
Agrostis concinna Tuckerm., Mag. Hort. Hovey 9: 143. 1843. Mount Monroe, White Mountains, N.H.

Agrostis pickeringii var. *rupicola* Tuckerm., Amer. Jour. Sci. 45: 42. 1843. White Mountains, N.H., *Pickering* and *Oakes*. Vermont, Camels Hump.

Trichodium concinnum Wood, Class-book ed. 2. 600. 1847. Based on *Agrostis concinna* Tuckerm.

Agrostis rubra var. *americana* Scribn., in Macoun, Cat. Can. Pl. 2^5: 391. 1890. Based on "*A. rupestris* Chapm. (non All.), found on Roan Mountain, North Carolina"; Tenn. Agr. Expt. Sta. Bull. 7: 77. f. 100. 1894. (See below.)

Agrostis novae-angliae Vasey, Contrib. U.S. Natl. Herb. 3: 76. 1892. Not *A. novae-angliae* Tuckerm. [Mount Washington, N.H., *Pringle*.]

Agrostis rubra var. *alpina* MacM., Met. Minn. Vall. 65. 1892. Based on *A. canina* var. *alpina* Oakes.

Agrostis borealis var. *macrantha* Eames, Rhodora 11: 88. 1909. Blow-me-down Mountains, Nova Scotia, *Eames* and *Godfrey* in 1908 [no. 5833, the spikelets abnormal].

Agrostis borealis var. *americana* Fernald, Rhodora 35: 205. 1933. Based on *A. rubra* var. *americana* Scribn.

Agrostis borealis forma *macrantha* Fernald, Rhodora 35: 205. 1933. Based on *A. borealis* var. *macrantha* Eames.

This species was erroneously referred to *Agrostis rupestris* All. by A. Gray in a list of plants from Roan Mountain, N.C., and by Chapman (Fl. South. U.S. 551. 1860).

(23) **Agrostis californica** Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 359. 1841. California. (*Vilfa glomerata* Presl erroneously cited as synonym.)

Agrostis densiflora Vasey, Contrib. U.S. Natl. Herb. 3: 72. 1892. Santa Cruz, Calif., *Anderson*.

Agrostis densiflora var. *arenaria* Vasey, Contrib. U.S. Natl. Herb. 3: 72. 1892. Mendocino County, Calif., *Pringle*.

Agrostis arenaria Scribn., Contrib. U.S. Natl. Herb. 3: 72. 1892. Not *A. arenaria* Gouan, 1773. As synonym of *A. densiflora* var. *arenaria* Vasey.

(30) **Agrostis canina** L., Sp. Pl. 62. 1753. Europe.

Trichodium caninum Schrad., Fl. Germ. 1: 198. 1806. Based on *Agrostis canina* L.

Agraulus caninus Beauv., Ess. Agrost. 5, 146, 147. 1812. Based on *Agrostis canina* L.

Agrostis canina var. *alpina* Wood, Amer. Bot. and Flor. pt. 2: 384. 1870. Not *A. canina* var. *alpina* Ducomm., 1869. Mountains of the Eastern States.

Agrostis alba var. *vulgaris* forma *aristata* Millsp., Fl. W.Va. 469. 1892. Monangalia, W.Va.

Agrestis canina Bubani, Fl. Pyr. 4: 286. 1901. Based on *Agrostis canina* L.

(19) **Agrostis diegoensis** Vasey, Bull. Torrey Bot. Club 13: 55. 1886. San Diego, Calif., *Orcutt*.

Agrostis foliosa Vasey, Bull. Torrey Bot. Club. 13: 55. 1886. Not *A. foliosa* Roem. and Schult., 1817. Oregon, *Howell* [type] and *Bolander*.

Agrostis diegoensis var. *foliosa* Vasey, Contrib. U.S. Natl. Herb. 3: 74. 1892. Based on *A. foliosa* Vasey.

Agrostis canina var. *stolonifera* Vasey, Contrib. U.S. Natl. Herb. 3: 75. 1892. Not *A. canina* var. *stolonifera* Blytt, 1847. Oregon, *Henderson* [type] and *Howell*.

Agrostis multiculmis Vasey; Beal, Grasses N.Amer. 2: 328. 1896, as synonym of *A. diegoensis* Vasey.

Agrostis pallens foliosa Hitchc., U.S. Dept. Agr., Bur. Plant Indus. Bull. 68: 34. pl. 14. f. 1. 1905. Based on *A. foliosa* Vasey.

(15) **Agrostis elliottiana** Schult., Mant. 2: 202. 1824. Based on *A. arachnoides* Ell.

Agrostis arachnoides Ell., Bot. S.C. and Ga. 1: 134. 1816. Not *A. arachnoides* Poir., 1810. Orangeburg, S.C., *Bennett*.

Notonema arachnoides Raf.; Jacks., Ind. Kew. 3: 319. 1894, as synonym of *Agrostis arachnoides* Ell.

(22) **Agrostis exarata** Trin., Gram. Unifl. 207. 1824. Unalaska, *Eschscholtz*.

Agrostis exarata var. *minor* Hook., Fl. Bor. Amer. 2: 239. 1839. Rocky Mountains, *Drummond*, *Douglas*.

Agrostis grandis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 316. 1841. "Columbia (*Hooker*)."

Agrostis asperifolia Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 317. 1841. "Amer. bor.? Chile? (*Hooker*)." Probably collected in the Rocky Mountains and received from Hooker.

Agrostis scouleri Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 329. 1841. Nootka Sound, Vancouver Island, [received from] *Hooker*.

Agrostis albicans Buckl. Acad. Nat. Sci. Phila. Proc. 1862: 91. 1863. Columbia woods, Oreg., *Nuttall*.

Agrostis oregonensis Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863, as synonym of *A. albicans* Buckl.

Agrostis exarata forma *asperifolia* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13[1]:pl. 31. 1892. Presumably based on *A. asperifolia* Trin.

Agrostis filiculmis Jones, Contrib. West. Bot. 14: 13. 1912. Little De Motte Park on the Kaibab, northern Arizona [*Jones* 6056bb].

AGROSTIS EXARATA var. AMPLA (Hitchc.) Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *A. ampla* Hitchc. (Published as *A. exarata ampla*.)

?*Agrostis exarata* var *pacifica* Vasey, U.S.Dept.Agr., Div. Bot. Spec. Bull. (new ed.) 1889: 107. pl. 106. 1889. Pacific coast, California to Alaska.

Agrostis ampla Hitchc., U.S. Dept. Agr., Bur. Plant Indus. Bull. 68: 38. pl. 20. 1905. Rooster Rock, Oreg., *Suksdorf* 135.

AGROSTIS EXARATA var. MONOLEPIS (Torr.) Hitchc., Amer. Jour. Bot. 21: 136. 1934. Based on *Polypogon monspeliensis* var. *monolepis* Torr.

Agrostis microphylla Steud., Syn. Pl. Glum. 1: 164. 1854. North America, *Douglas*.

Agraulus brevifolius Nees; Torr. U.S. Rept. Expl. Miss. Pacif. 4: 154. 1857, as synonym of *Agrostis microphylla* Steud.

Polypogon monspeliensis var. *monolepis* Torr., U.S. Rept. Expl. Miss. Pacif. 5: 366. 1857. Posé Creek, Walkers Pass, Calif., [*Blake*].

Polypogon alopecuroides Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 88. 1863. Columbia Plains, Oreg., *Nuttall*.

Agrostis alopecuroides A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 333. 1863. Not *A. alopecuroides* Lam., 1791. Based on *Polypogon alopecuroides* Buckl.

Deyeuxia alopecuroides Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 333. 1863, as synonym of *Polypogon alopecuroides* Buckl.

Agrostis microphylla var. *major* Vasey, Contrib. U.S. Natl. Herb. 3: 58, 72. 1892. [Truckee Valley, Nev., *Watson* 1284.]

Agrostis exarata var. *microphylla* S. Wats.; Vasey, Contrib. U.S. Natl. Herb. 3: 72. 1892, as synonym of *A. microphylla* var. *major* Vasey.

Agrostis inflata Scribn., Canad. Rec. Sci. 152. 1894. Vancouver Island, *Macoun* 258.

Agrostis virescens microphylla Scribn., U.S. Dept. Agr., Div. Agrost. Circ. 30: 2. 1901. Based on *A. microphylla* Steud.

Agrostis exarata microphylla Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *A. microphylla* Steud.

(14) **Agrostis exigua** Thurb., in S. Wats., Bot. Calif. 2: 275. 1880. Foothills of Sierras, Calif., *Bolander*.

(16) **Agrostis hallii** Vasey, Contrib. U.S. Natl. Herb. 3: 74. 1892. Oregon [type, *Hall* in 1872], Washington, and California.

Agrostis davyi Scribn., U.S. Dept.Agr., Div. Agrost. Circ. 30: 3. 1901. Point Arena, Calif., *Davy* and *Blasdale* 6062.

Agrostis occidentalis Scribn. and Merr., Bull. Torrey Bot. Club 29: 466. 1902. McMinnville, Oreg., *Shear* 1644.

AGROSTIS HALLII var. PRINGLEI (Scribn.) Hitchc., U.S.Dept.Agr., Bur. Plant Indus. Bull. 68: 33. pl. 12. 1905. Based on *A. pringlei* Scribn. (Published as *A. hallii pringlei*.)

Agrostis pringlei Scribn., U.S. Dept. Agr., Div. Agrost. Bull. 7: 156. f. 138. 1897. Mendocino County, Calif., *Pringle*.

(13) **Agrostis hendersonii** Hitchc., Jour. Wash. Acad. Sci. 20: 381. 1930. Sams Valley, near Gold Hill, Jackson County, Oreg., *Henderson* 12387.

(25) **Agrostis hiemalis** (Walt.) B.S.P., Prel. Cat. N.Y. 68. 1888. Based on *Cornucopiae hiemalis* Walt.

Cornucopiae hyemalis Walt., Fl. Carol. 73. 1788. South Carolina.

Agrostis scabra Willd., Sp. Pl. 1: 370. 1797. North America.

Trichodium laxiflorum Michx., Fl. Bor. Amer. 1: 42. 1803. Hudson Bay to Florida, *Michaux*.

Agrostis laxiflora Poir., in Lam., Encycl. Sup. 1: 255. 1810. Carolina, *Bosc*.

Vilfa scabra Beauv., Ess. Agrost. 16, 182. 1812. Based on *Agrostis scabra* Willd.

Trichodium scabrum Muhl., Cat. Pl. 10. 1813. Based on *Agrostis scabra* Willd.

Agrostis laxa Schreb.; Pursh, Fl. Amer. Sept. 1: 61. 1814, as synonym of *Trichodium laxiflorum* Michx.

Agrostis laxiflora Richards., Bot. App. Franklin Jour. 731. 1823. Based on *Trichodium laxiflorum* Michx.

Trichodium montanum Torr., Fl. North. and Mid. U.S. 84. 1823. Fishkill Mountains, N.Y.

Trichodium laxum Schult., Mant. 2: 157. 1824. Based on *T. laxiflorum* Muhl., Schultes supposing it to be different from *T. laxiflorum* Michx., but Muhlenberg's species is the same as Michaux's.

Trichodium album Presl, Rel. Haenk. 1: 244. 1830. Nootka Sound, Vancouver Island, *Haenke.*

Agrostis nutkaensis Kunth, Enum. Pl. 1: 222. 1833. Based on *Trichodium album* Presl.

Agrostis nootkaensis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 326. 1841. Based on *Trichodium album* Presl.

Agrostis laxiflora var. *montana* Tuckerm., Amer. Jour. Sci. 45: 43. 1843. Based on *Trichodium montanum* Torr.

Agrostis scabra var. *tenuis* Tuckerm., Amer. Jour. Sci. 45: 45. 1843. Lincoln, N.H.

Agrostis laxiflora var. *caespitosa* Torr., Fl. N.Y. 2: 442. 1843. New York.

Agrostis laxiflora var. *scabra* Torr., Fl. N.Y. 2: 442. 1843. Based on *A. scabra* Willd.

Agrostis laxiflora var. *tenuis* Torr., Fl. N.Y. 2: 442. 1843. Based on *A. scabra* var. *tenuis* Tuckerm.

Agrostis torreyi Tuckerm., Mag. Hort. Hovey 9: 143. 1843. Not *A. torreyi* Kunth, 1830. Based on *Trichodium montanum* Torr.

Agrostis scabra var. *oreophila* Wood, Class-book 774. 1861. Based on *A.* [*laxiflora* var.] *montana* Tuckerm. (There is no reference to *A. oreophila* Trin.)

Agrostis scabriuscula Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 90. 1863. Columbia Plains, Oreg., *Nuttall.*

Agrostis scabrata Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863, as synonym of *A. scabriuscula* Buckl.

Agrostis scabra var. *montana* Fernald, Portland Soc. Nat. Hist. Proc. 2: 91. 1895. Based on *Trichodium montanum* Torr. This combination was made by Vasey, giving Tuckerm. as author (Contrib. U.S. Natl. Herb. 3: 76. 1892), the basis not given, and erroneously cited as synonym of *A. novae-angliae* Vasey.

Agrostis canina var. *hiemalis* Kuntze, Rev. Gen. Pl. 3^2: 338. 1898. Based on *Cornucopiae hiemalis* Walt.

Agrostis antecedens Bicknell, Bull. Torrey Bot. Club 35: 473. 1908. Nantucket, *Bicknell* in 1908.

Agrostis hiemalis nutkaensis Scribn. and Merr., Contrib. U.S. Natl. Herb. 13: 56. 1910. Based on *A. nutkaensis* Kunth.

Agrestis hyemalis Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Cornucopiae hiemalis* Walt.

Agrostis scabra forma *tuckermani* Fernald, Rhodora 35: 207. 1933. Braintree, Mass., *Churchill* in 1911.

AGROSTIS HIEMALIS VAR. GEMINATA (Trin.) Hitchc., U.S.Dept.Agr., Bur. Plant Indus. Bull. 68: 44. 1905. Based on *A. geminata* Trin. (Published as *A. hiemalis geminata.*)

Agrostis geminata Trin., Gram. Unifl. 207. 1824. Unalaska, *Eschscholtz.*

Agrostis geminata forma *exaristata* Fernald, Rhodora 35: 211. 1933. Gaspé County, Quebec, *Fernald, Dodge* and *Smith* 25, 485.

(24) **Agrostis howellii** Scribn., Contrib. U.S. Natl. Herb. 3: 76. 1892. Hood River, Oreg., *Howell* 198.

(12) **Agrostis humilis** Vasey, Bull. Torrey Bot. Club 10: 21. 1883. Mount Paddo [Adams], Wash., *Howell* [85].

(26) **Agrostis idahoensis** Nash, Bull. Torrey Bot. Club 24: 42. 1897. Forest, Idaho, *Heller* 3431.

Agrostis tenuis Vasey, Bull. Torrey Bot. Club 10: 21. 1883. Not *A. tenuis* Sibth., 1794. San Bernardino Mountains, Calif., *Parish Bros.* [1085].

Agrostis tenuiculmis Nash, in Rydb., Mem. N.Y. Bot. Gard. 1: 32. 1900. Based on *A. tenuis* Vasey.

Agrostis tenuiculmis recta Nash, in Rydb., Mem. N.Y. Bot. Gard. 1: 32. 1900. [Belt Pass, Mont., *Rydberg* 3327½.]

Agrostis tenuis erecta Vasey; Nash, in Rydb., Mem. N.Y. Bot. Gard. 1: 32. 1900, as synonym of *A. tenuiculmis recta* Nash.

(3) **Agrostis interrupta** L., Syst. Nat. ed. 10. 2: 872. 1759. Europe.

Apera interrupta Beauv., Ess. Agrost. 151. 1812. Based on *Agrostis interrupta* L.

Anemagrostis interrupta Trin., Fund. Agrost. 129. 1820. Based on *Agrostis interrupta* L.

Muhlenbergia interrupta Steud., Syn. Pl. Glum. 1: 177. 1854. Based on *Agrostis interrupta* L.

Agrostis spica-venti var. *interrupta* Hook. f., Stud. Fl. 432. 1870. Based on *A. interrupta* L.

Agrostis anemagrostis subsp. *interrupta* Syme, in Sowerby, English Bot. ed. 3. 11: 44. 1873. Based on *A. interrupta* L.

Apera spica-venti var. *interrupta* Beal, Grasses N.Amer. 2: 357. 1896. Based on *Agrostis interrupta* L.

Agrestis interrupta Bubani, Fl. Pyr. 4: 289. 1901. Based on *A. interrupta* L.

(17) **Agrostis lepida** Hitchc., in Jepson, Fl. Calif. 1: 121. 1912. Siberian Pass, Sequoia National Park, Calif., *Hitchcock* 3455.

(32) **Agrostis longiligula** Hitchc., U.S.Dept.Agr., Bur. Plant Indus. Bull. 68: 54. 1905. Fort Bragg, Calif., *Davy* and *Blasdale* 6110.

Agrostis nebulosa Boiss. and Reut., Bibl. Univ. Genève (n.s.) 38: 218. 1842. Spain.

(9) **Agrostis nigra** With., Bot. Arr. Veg. Brit. ed. 3. 2: 131. 1796. Europe.

(29) **Agrostis oregonensis** Vasey, Bull. Torrey Bot. Club 13: 55. 1886. Oregon, *Howell* [49].

Agrostis attenuata Vasey, Bot. Gaz. 11: 337. 1886. Mount Hood, Oreg., *Howell* [210].

Agrostis hallii var. *californica* Vasey, Contrib. U.S. Natl. Herb. 3: 74. 1892. California [*Bolander* 6103].

Agrostis schiedeana var. *armata* Suksdorf, Werdenda 1^2: 1. 1923. Klickitat County, Wash., *Suksdorf* 6310.

(18) **Agrostis pallens** Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 328. 1841. "Amer.-borealis? (*Hooker*)."

Agrostis exarata var. *littoralis* Vasey, Bull. Torrey Bot. Club 13: 54. 1886. Oregon, *Howell* [64].

Agrostis densiflora var. *littoralis* Vasey, Contrib. U.S. Natl. Herb. 3: 72. 1892. Based on *A. exarata* var. *littoralis* Vasey.

(8) **Agrostis palustris** Huds., Fl. Angl. 27. 1762. England.

Agrostis polymorpha var. *palustris* Huds., Fl. Angl. 32. 1778. Based on *A. palustris* Huds.

Agrostis maritima Lam., Encycl. 1: 61. 1783. France.

Agrostis alba var. *palustris* Pers., Syn. Pl. 1: 76. 1805. Based on *A. palustris* Huds.

Milium maritimum Clem. y Rubio, Ensay. Vid Andaluc. 285. 1807. Based on *Agrostis maritima* Lam.

Agrostis decumbens Gaud.; Muhl., Descr. Gram. 68. 1817. Not *A. decumbens* Host, 1809. Pennsylvania, New Jersey.

Vilfa stolonifera var. *maritima* S. F. Gray, Nat. Arr. Brit. Pl. 2: 146. 1821. Based on *Agrostis maritima* With. (error for Lam.)

Apera palustris S. F. Gray, Nat. Arr. Brit. Pl. 2: 148. 1821. Based on *Agrostis palustris* With. (error for Huds.).

Agrostis alba var. *maritima* G. Meyer, Chloris Hanov. 656. 1836. Based on *A. maritima* Lam.

Agrostis stolonifera var. *maritima* Koch, Syn. Fl. Germ. Helv. 781. 1837. Based on *A. maritima* Lam.

?*Agrostis alba* var. *decumbens* Eaton and Wright, N.Amer. Bot. ed. 8. 117. 1840. Not *A. alba* var. *decumbens* Gaudin, 1828. Eastern United States.

Agrostis stolonifera var. *compacta* Hartm., Handb. Skand. Flora ed. 4. 24. 1843. Scandinavia.

Agrostis depressa Vasey, Bull. Torrey Bot. Club 13: 54. 1886. Clear Creek Canyon, Colo., *Patterson* in 1885.

Agrostis exarata var. *stolonifera* Vasey, Bull. Torrey Bot. Club 13: 54. 1886 Columbia River, *Suksdorf*.

Agrostis reptans Rydb., Fl. Rocky Mount. 54. 1917. Based on *A. exarata* var. *stolonifera* Vasey.

Agrostis stolonifera var. *palustris* Farwell, Mich. Acad. Sci. Rept. 21: 351. 1920. Based on *A. polymorpha* var. *plaustris* Huds.

New England specimens of this species have been referred to *A. alba* var. *coarctata* Scribn., based on *A. coarctata* Ehrh., of Germany, which appears to be a narrow-panicled form of *A. stolonifera* L.

(28) **Agrostis perennans** (Walt.) Tuckerm., Amer. Jour. Sci. 45: 44. 1843. Based on *Cornucopiae perennans* Walt.

Cornucopiae perennans Walt., Fl. Carol. 74. 1788. South Carolina.

Agrostis cornucopiae Smith, Gentleman's Mag. 59: 873. 1789. Based on *Cornucopiae perennans* Walt.

Agrostis elegans Salisb., Prodr. Stirp. 25. 1796. Based on *Cornucopiae perennans* Walt.

Agrostis anomala Willd., Sp. Pl. 1: 370. 1797. Based on *Cornucopiae perennans* Walt.

Alopecurus carolinianus Spreng., Nachtr. Bot. Gart. Halle 10. 1801. Not *A. carolinianus* Walt., 1788. [Kentucky, *Peter.*]

Trichodium decumbens Michx., Fl. Bor. Amer. 1: 42. 1803. Virginia to Florida, *Michaux.*

Trichodium perennans Ell., Bot. S.C. and Ga. 1: 99. 1816. Based on *Cornucopiae perennans* Walt.

Trichodium muhlenbergianum Schult., Mant. 2: 159. 1824. Pennsylvania, *Muhlenberg.* Based on Muhlenberg's *Trichodium* no. 4.

Agrostis michauxii Trin., Gram. Unifl. 206. 1824. Not *A. michauxii* Zucc. 1809. Based on *Trichodium decumbens* Michx.

Agrostis noveboracensis Spreng., Syst. Veg. 1: 260. 1825. New York, *Torrey.*

Agrostis decumbens Link, Hort. Berol. 1: 80. 1827. Not *A. decumbens* Host, 1809. Based on *Trichodium decumbens* Michx.

Trichodium noveboracense Schult., Mant. 3 (Add. 1): 555. 1827. Based on *Agrostis noveboracensis* Spreng.

Trichodium scabrum [Muhl., misapplied by] Darl., Fl. Cestr. 1: 54. 1837. Pennsylvania.

Agrostis schweinitzii Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 311. 1841. Pennsylvania, *Schweinitz.*

Agrostis oreophila Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 323. 1841. Bethlehem, Pa., *Moser.* (*Trichodium montanum* Torr. is erroneously cited as synonym.)

Agrostis abakanensis Less.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 325. 1841, as synonym of *A. michauxii* Trin.

Agrostis schiedeana Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 327. 1841. Mexico, type received from Schrader.

Agrostis novae-angliae Tuckerm., Mag. Hort. Hovey 9: 143. 1843. White Mountains, N.H.

Agrostis campyla Tuckerm., Amer. Jour. Sci. II. 6: 231. 1848. Based on *A. scabra* as described by Tuckerman.

Agrostis scabra var. *perennans* Wood, Class-book 774. 1861. Presumably based on *A. perennans* Tuckerm.

Agrostis perennans var. *aestivalis* Vasey, Contrib. U.S. Natl. Herb. 3: 76. 1892. Athens, Ill. [*Hall*]. The slender lax form.

Agrostis intermedia Scribn., Bull. Torrey Bot. Club 20: 476. 1893. Not *A. intermedia* Balb.,1801. Pine Mountain, Harlan County, Tenn. *Kearney* 39.

Agrostis pseudointermedia Farwell, Ann. Rept. Commr. Parks and Boul. Detroit 11: 46. 1900. Based on *A. intermedia* Scribn.

Agrostis scribneriana Nash, in Small, Fl. Southeast. U.S. 126. 1903. Based on *A. intermedia* Scribn.

Agrostis perennans var. *humilis* Farwell, Mich. Acad. Sci. Papers 1: 87. 1921. Detroit, *Farwell* 5672½.

AGROSTIS PERENNANS var. ELATA (Pursh) Hitchc., U.S.Dept.Agr., Bur. Plant Indus. Bull. 68: 50. 1905. Based on *Trichodium elatum* Pursh. (Published as *A. perennans elata.*)

?*Cornucopiae altissima* Walt., Fl. Carol. 74. 1788. South Carolina. Possibly *Agrostis alba* L.

Trichodium elatum Pursh, Fl. Amer. Sept. 1: 61. 1814. New Jersey, Carolina.

Agrostis elata Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 317. 1841. Based on *Trichodium elatum* Pursh.

?*Agrostis altissima* Tuckerm., Amer. Jour. Sci. 45: 44. 1843. Based on *Cornucopiae altissima* Walt.

?*Trichodium altissimum* Michx.; Wood. Class-book ed. 2. 599. 1847. Based on *Cornucopiae altissima* Walt.

Agrostis hyemalis var. *elata* Fernald, Rhodora 23: 229. 1921. Based on *Trichodium elatum* Pursh.

Agrostis perennans forma *chaetophora* Fernald, Rhodora 35: 317. 1933. Huntington County, Pa., *Lowrie.*

Agrostis perennans var. *aestivalis* forma *atherophora* Fernald, Rhodora 35: 317. 1933. Terrebonne, Quebec, *Churchill.*

(1) **Agrostis retrofracta** Willd., Enum. Pl. 1: 94. 1809. Australia.

Vilfa retrofracta Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis retrofracta* Willd.

Lachnagrostis retrofracta Trin., Fund. Agrost. 128. 1820. Based on *Agrostis retrofracta* Willd.

Lachnagrostis willdenovii Trin., Gram. Unifl. 217. 1824. Based on *Agrostis retrofracta* Willd.

Deyeuxia retrofracta Kunth, Rév. Gram. 1: 77. 1829. Based on *Agrostis retrofracta* Willd.

Calamagrostis retrofracta Link; Steud., Nom. Bot. ed. 2. 1: 251. 1840. Based on *Agrostis retrofracta* Willd.

Calamagrostis willdenovii Steud., Syn. Pl. Glum. 1: 192. 1854. Based on *Lachnagrostis willdenovii* Trin.

(21). **Agrostis rossae** Vasey, Contrib. U.S. Natl. Herb. 3: 76. 1892. Yellowstone Park, Wyo., *Edith Ross* in 1890.

Agrostis varians Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 314. 1841. Not *A. varians* Thuill., 1790. "America boreal? (Hoocker 217)." A duplicate type in the Torrey Herbarium (N.Y. Bot. Gard.) is labeled Rocky Mountains, *Hooker* 217.

Agrostis variabilis Rydb., Mem. N.Y. Bot. Gard. 1: 32. 1900. Based on *A. varians* Trin.

(2) **Agrostis spica-venti** L., Sp. Pl. 61. 1753. Europe.

Agrostis gracilis Salisb., Prodr. Stirp. 25. 1796. Based on *A. spica-venti* L.

Apera spica-venti Beauv., Ess. Agrost. 151. 1812. Based on *Agrostis spica-venti* L.

Anemagrostis spica-venti Trin., Fund. Agrost. 129. 1820. Based on *Agrostis spica-venti* L.

Festuca spica-venti Raspail, Ann. Sci. Nat., Bot. 5: 445. 1825. Based on *Agrostis spica-venti* L.

Muhlenbergia spica-venti Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 285. 1841. Based on *Agrostis spica-venti* L.

Agrostis ventosa Dulac, Fl. Haut. Pyr. 74. 1867. Based on *Apera spica-venti* Beauv.

Agrostis anemagrostis Syme, in Sowerby, English Bot. ed. 3. 11: 43. 1873. Based on *Anemagrostis spica-venti* Trin.

Agrostis anemagrostis subsp. *spica-venti* Syme, in Sowerby, English Bot. ed. 3. 11: 43. 1873. Based on *A. spica-venti* L.

(7) **Agrostis stolonifera** L., Sp. Pl. 62. 1753. Europe.

Decandolia stolonifera Bast., Fl. Maine-et-Loire 29. 1809. Based on *Agrostis stolonifera* L.

Vilfa stolonifera Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis stolonifera* L.

Agrostis alba var. *stolonifera* Smith, English Fl. 1: 93. 1824. Based on *A. stolonifera* L.

Agrostis vulgaris var. *stolonifera* Koch, Syn. Fl. Germ. Helv. 782. 1837. Based on *A. stolonifera* L.

(11) **Agrostis tenuis** Sibth., Fl. Oxon. 36. 1794. Based on *A. capillaris* Huds.

Agrostis capillaris Huds., Fl. Angl. ed. 2. 27. 1762. Not *A. capillaris* L., 1753. England.

Agrostis sylvatica Huds., Fl. Angl. ed. 2. 28. 1762. England. A teratological form, the florets abnormally elongated. Name rejected, being based on a monstrosity.

Agrostis vulgaris With., Bot. Arr. Veg. Brit. ed. 3. 2: 132. 1796. Europe.

Vilfa vulgaris Beauv., Ess. Agrost. 16, pl. 5. f. 8. 1812. Based on *Agrostis vulgaris* With.

Agrostis alba var. *sylvatica* Smith, English Fl. 1: 93. 1824. Based on *A. sylvatica* Huds. Published as new by Scribner, Mem. Torrey Club 5: 40. 1894, the basis given as "*A. sylvatica* L." error for Huds.

Agrostis alba var. *vulgaris* Coss. and Dur., Expl. Sci. Alger. 2: 63. 1867. Based on *A. vulgaris* With.

Agrostis stolonifera var. *vulgaris* Celak., Prodr. Fl. Böhm. 710. 1881. Not *A. stolonifera* var. *vulgaris* Heuff., 1858. Based on *A. vulgaris* With.

Agrostis alba var. *minor* Vasey, Contrib. U.S. Natl. Herb. 3: 78. 1892. [Washington, D.C.]

This species has been referred to *Agrostis capillaris* L., a European species not known from America.

AGROSTIS TENUIS var. ARISTATA (Parnell) Druce, List Brit. Pl. 79. 1908. Presumably based on *A. vulgaris* var. *aristata* Parnell.

Agrostis stricta Willd., Sp. Pl. 1: 366. 1797. Not *A. stricta* Gmel., 1791. North America.

Agrostis stricta Muhl., Descr. Gram. 65. 1817. Not *A. stricta* Gmel., 1791. New England and Carolina.

Trichodium strictum Roem. and Schult., Syst. Veg. 2: 281. 1817. Based on *Agrostis stricta* Willd.

Agrostis diffusa Muhl.; Spreng., Syst. Veg. 1: 260. 1825. Not *A. diffusa* Host, 1809, nor Muhl., 1817. As synonym of *A. stricta* Muhl.

Agrostis vulgaris var. *aristata* Parnell, Grasses Scotl. 1[1]: 34. pl. 13. 1842. Scotland.

Agrostis alba var. *aristata* A. Gray, Man. 578. 1848. Not *A. alba* var. *aristata* Spenner, 1825. Based on *A. stricta* Willd.

Agrostis stricta Buse, in Miquel, Pl. Jungh. 341. 1854. Not *A. stricta* Gmel., 1791. Based on *Trichodium strictum* Roem. and Schult.

Agrostis alba var. *stricta* Wood, Class-book 774. 1861. Based on *A. stricta* Willd.

Agrostis tenuis forma *aristata* (Parnell) Wiegand, Rhodora 26: 2. 1924. Based on *A. vulgaris* var. *aristata* Parnell.

Agrostis palustris var. *stricta* House, N.Y. State Mus. Bull. 254: 98. 1924. Based on *Agrostis stricta* Willd.

Agrostis capillaris var. *aristata* Druce, Fl. Oxfordsh. ed. 2. 474. 1927. Presumably based on *A. vulgaris* var. *aristata* Parnell.

Agrostis capillaris aristulata Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Alexandria, Va. *Amer. Gr. Nat. Herb.* 344.

(4) **Agrostis thurberiana** Hitchc., U.S.Dept.Agr., Bur. Plant Indus. Bull. 68: 23. pl. 1. f. 1. 1905. Skamania County, Wash., *Suksdorf* 1021.

Agrostis hillebrandii Thurb.; Boland. Agr. Soc. Calif. Trans. 1864–1865: 136. 1866. Name only. Sierra Nevada, Calif., *Hillebrand.*

Agrostis atrata Rydb., Bull. Torrey Bot. Club 36: 531. 1909. Yoho Valley, British Columbia, *Macoun* 64787.

(6) **Agrostis verticillata** Vill., Prosp. Pl. Dauph. 16. 1779. France.

Agrostis alba var. *verticillata* Pers., Syn. Pl. 1: 76. 1805. Based on *A. verticillata* Vill.

Agrostis villarsii Poir., in Lam., Encycl. Sup. 1: 251. 1810. Based on *A. verticillata* Vill.

Vilfa verticillata Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis verticillata* Vill.

Agrostis decumbens Muhl.; Ell., Bot. S.C. and Ga. 1: 136. 1816. Not *A. decumbens* Host, 1809. Charleston, S.C.

Agrostis stolonifera var. *verticillata* St. Amans, Fl. Agen. 28. 1821. Based on *A. verticillata* Vill.

Agrostis condensata Willd.; Steud., Nom. Bot. ed. 2. 1: 40. 1840, as synonym of *A. verticillata* Vill.

Agrostis leptos Steud., Syn. Pl. Glum. 1: 169. 1854. Louisiana.

Agrostis aquatica Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 90. 1863. Not *A. aquatica* Pourr., 1783. San Saba County, Tex.

Agrestis verticillata Bubani, Fl. Pyr. 4: 282. 1901. Based on *Agrostis verticillata* Vill.

(56) AIRA L.

(3) **Aira capillaris** Host, Icon. Gram. Austr. 4: 20. pl. 35. 1809. Europe.

Avena capillaris Mert. and Koch, in Roehl., Deut. Fl. ed. 3. 1[2]: 573. 1823. Based on *Aira capillaris* Host.

Airopsis capillaris Schur, Oesterr. Bot. Ztschr. 9: 328. 1859. Based on *Aira capillaris* Host.

Fussia capillaris Schur, Enum. Pl. Transsilv. 754. 1866. Based on *Aira capillaris* Host.

Airella capillaris Dum., Bull. Soc. Bot. Belg. 7[1]: 68. 1868. Based on *Aira capillaris* Host.

Aspris capillaris Hitchc., U.S. Dept. Agr. Bull. 772: 116. 1920. Based on *Aira capillaris* Host.

(2) **Aira caryophyllea** L., Sp. Pl. 66. 1753. Europe.
Avena caryophyllea Wigg., Prim. Fl. Hols. 10. 1780. Based on *Aira caryophyllea* L.
Agrostis caryophyllea Salisb., Prodr. Stirp. 25. 1796. Based on *Aira caryophyllea* L.
Airopsis caryophyllea Fries, Nov. Fl. Suec. ed. 2. Cont. 3: 180. 1842. Based on *Aira caryophyllea* L.
Caryophyllea airoides Opiz, Sezn. Rostl. Ceské 27. 1852. Based on *Aira caryophyllea* L.
Fussia caryophyllea Schur, Enum. Pl. Transsilv. 754. 1866. Based on *Aira caryophyllea* L.
Airella caryophyllea Dum., Bull. Soc. Bot. Belg. 7^1: 68. 1868. Based on *Aira caryophyllea* L.
Salmasia vulgaris Bubani, Fl. Pyr. 4: 316. 1901. Based on *Aira caryophyllea* L.
Aspris caryophyllea Nash, in Britt. and Brown, Illustr. Fl. ed. 2. 1: 214. 1913. Based on *Aira caryophyllea* L.

(1) **Aira praecox** L., Sp. Pl. 65. 1753. Europe.
Agrostis praecox Salisb., Prodr. Stirp. 24. 1796. Based on *Aira praecox* L.
Avena praecox Beauv., Ess. Agrost. 89, 154. 1812. Based on *Aira praecox* L.
Trisetum praecox Dum., Obs. Gram. Belg. 122. pl. 8. f. 30. 1823. Based on *Aira praecox* L.
Airopsis praecox Fries, Nov. Fl. Suec. ed. 2. Cont. 3: 180. 1842. Based on *Aira praecox* L.
Caryophyllea praecox Opiz, Sezn. Rostl. Ceské 27. 1852. Based on *Aira praecox* L.
Fussia praecox Schur, Enum. Pl. Transsilv. 754. 1866. Based on *Aira praecox* L.
Airella praecox Dum., Bull. Soc. Bot. Belg. 7^1: 68. 1868. Based on *Aira praecox* L.
Salmasia praecox Bubani, Fl. Pyr. 4: 316. 1901. Based on *Aira praecox* L.
Aspris praecox Nash, in Britt. and Brown, Illustr. Fl. ed. 2. 1: 215. 1913. Based on *Aira praecox* L.

(69) ALOPECURUS L.

(5) **Alopecurus aequalis** Sobol., Fl. Petrop. 16. 1799. Greece.
Alopecurus aristulatus Michx., Fl. Bor. Amer. 1: 43. 1803. Canada, *Michaux.*
Alopecurus fulvus J. E. Smith, in Sowerby, English Bot. 21: pl. 1467. 1805. England.
Alopecurus subaristatus Pers., Syn. Pl. 1: 80. 1805. Canada.
Alopecurus geniculatus var. *natans* Wahl., Fl. Lapp. 22. 1812. Lapland.
Alopecurus geniculatus var. *aristulatus* Torr., Fl. North. and Mid. U.S. 1: 97. 1823. Based on *A. aristulatus* Michx.
Alopecurus caespitosus Trin., Gram. Icon. 3: pl. 241. 1836. North America, [type, Northwest America, *Douglas*].
Alopecurus geniculatus var. *fulvus* Schrad., Linnaea 12: 424. 1838. Based on *A. fulvus* J. E. Smith.
Alopecurus geniculatus var. *robustus* Vasey, Bull. Torrey Bot. Club 15: 13. 1888. Vancouver Island, *Macoun.*
Alopecurus howellii var. *merrimani* Beal, Grasses N.Amer. 2: 278. 1896. Pribilof Islands, Alaska, "C. H. Merriman" [error for *Merriam*].
Alopecurus howellii var. *merriami* Beal; Macoun, in Jordan, Fur Seals North Pacif. 3: 573. 1899. (Correction of var. *merrimani* Beal.)
Alopecurus aristulatus var. *natans* Simmons, Arkiv Bot. 6^{17}: 4. 1907. Based on *A. geniculatus* var. *natans* Wahl.
Tozzettia fulva Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Alopecurus fulvus* J. E. Smith.
Alopecurus artistulatus var. *merriami* St. John, Canada Dept. Mines Mem. 126: 42. 1922. Based on *A. howellii* var. *merriami* Beal.
Alopecurus aequalis var. *natans* Fernald, Rhodora 27: 198. 1925. Based on *Alopecurus geniculatus* var. *natans* Wahl.

(3) **Alopecurus alpinus** J. E. Smith, in Sowerby, English Bot. pl. 1126. 1803. Scotland.
?*Alopecurus borealis* Trin., Fund. Agrost. 58. 1820. Asia and North America.
Alopecurus occidentalis Scribn. and Tweedy, Bot. Gaz. 11: 170. 1886. Yellowstone National Park, *Tweedy.*
Alopecurus behringianus Gandog., Bull. Soc. Bot. France 66^7: 298. 1920. St. Paul Island, Alaska, *Macoun.*

Vasey misapplied the name *Alopecurus pratensis* var. *alpestris* Wahl. to this species in Contrib. U.S. Natl. Herb. 3: 86. 1892.

(7) **Alopecurus carolinianus** Walt., Fl. Carol. 74. 1788. South Carolina.
Alopecurus ramosus Poir., in Lam., Encycl. 8: 776. 1808. Carolina, *Bosc.*
Alopecurus pedalis Bosc; Beauv., Ess. Agrost. 4. 1812. Name only. [Carolina, *Bosc.*]
Alopecurus gracilis Willd.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 38. 1840. Carolina [*Bosc*].
Alopecurus macounii Vasey, Bull. Torrey Bot. Club 15: 12. 1888. Oak Bay, Vancouver Island, *Macoun.*
Alopecurus geniculatus var. *caespitosus* Scribn., in Macoun, Cat. Can. Pl. 2^5: 389. 1890. Yale, British Columbia, *Macoun.*
Alopecurus geniculatus var. *ramosus* St. John, Rhodora 19: 167. 1917. Based on *A. ramosus* Poir.

Alopecurus creticus Trin., in Spreng., Neu. Entd. 2: 45. 1821. Crete.

(6) **Alopecurus geniculatus** L., Sp. Pl. 60. 1753. Europe.
Tozzettia geniculata Bubani, Fl. Pyr. 4: 275. 1901. Based on *Alopecurus geniculatus* L.

(8) **Alopecurus howellii** Vasey, Bull. Torrey Bot. Club 15: 12. 1888. [Medford], Oreg., *Howell* [215].
Alopecurus californicus Vasey, Bull. Torrey Bot. Club 15: 13. 1888. California [type, Santa Cruz, *Anderson*] and Oregon.

(1) **Alopecurus myosuroides** Huds., Fl. Angl. 23. 1762. England.
Alopecurus agrestis L., Sp. Pl. ed. 2. 1: 89. 1762. Europe.
Tozzettia agrestis Bubani, Fl. Pyr. 4: 274. 1901. Based on *Alopecurus agrestis* L.

(4) **Alopecurus pallescens** Piper, Fl. Palouse 18. 1901. Pullman, Wash., *Piper* 1743.

(2) **Alopecurus pratensis** L., Sp. Pl. 60. 1753. Europe.

(9) **Alopecurus saccatus** Vasey, Bot. Gaz. 6: 290. 1881. Eastern Oregon, *Howell.*

(62) AMMOPHILA Host

(1) **Ammophila arenaria** (L.) Link, Hort. Berol. 1: 105. 1827. Based on *Arundo arenaria* L.
Arundo arenaria L., Sp. Pl. 82. 1753. Europe.
Calamagrostis arenaria Roth, Tent. Fl. Germ. 1: 34. 1788. Based on *Arundo arenaria* L.
Ammophila arundinacea Host, Icon. Gram. Austr. 4: 24. pl. 41. 1809. Based on *Arundo arenaria* L.
Psamma littoralis Beauv., Ess. Agrost. 144. pl. 6. f. 1. 176. 1812. Europe.
Psamma arenaria Roem. and Schult., Syst. Veg. 2: 845. 1817. Based on *Calamagrostis arenaria* Roth.
Phalaris maritima Nutt., Gen. Pl. 1: 48. 1818. Based on *Arundo arenaria* L., but misapplied to *Ammophila breviligulata.*
Phalaris ammophila Link, Enum. Hort. Berol. 1: 66. 1821. Based on *Ammophila arundinacea* Host.
Arundo littoralis Beauv.; Steud., Nom. Bot. ed. 2. 1: 144. 1840, as synonym of *Calamagrostis arenaria* Roth.

(2) **Ammophila breviligulata** Fernald, Rhodora 22: 71. 1920. Milford, Conn., *Bissell* in 1902.

Ampelodesmos mauritanicus (Poir.) Dur. and Schinz, Consp. Fl. Afr. 5: 874. 1894. Based on *Arundo mauritanica* Poir.
Arundo mauritanica Poir., Voy. Barb. 2: 104. 1789. Algeria.
Arundo tenax Vahl, Symb. Bot. 2: 25. 1791. Tunis.
Ampelodesmos tenax Link, Hort. Berol. 1: 136. 1827. Based on *Arundo tenax* Vahl.

(138) AMPHICARPUM Kunth

(2) **Amphicarpum muhlenbergianum** (Schult.) Hitchc., Bartonia 14: 34. 1932. Based on *Milium muhlenbergianum* Schult.
Milium ? muhlenbergianum Schult., Mant. 2: 178. 1824. Based on *Milium* no. 3 of Muhlenberg's Descriptio Graminum. Muhlenberg's specimen is without locality.
Amphicarpon floridanum Chapm., Fl. South. U.S. 572. 1860. Apalachicola River, Fla.

(1) **Amphicarpum purshii** Kunth, Rév. Gram. 1: 28. 1829. Based on *Milium amphicarpon* Pursh.
Milium amphicarpon Pursh, Fl. Amer. Sept. 1: 62. pl. 2. 1814. Egg Harbor, N.J.
Milium ciliatum Muhl., Descr. Gram. 77. 1817. Not *M. ciliatum* Moench. New Jersey.
Amphicarpon amphicarpon Nash, Mem. Torrey Bot. Club 5: 352. 1894. Based on *Milium amphicarpon* Pursh.

(145) ANDROPOGON L.

(16) **Andropogon arctatus** Chapm., Bot. Gaz. 3: 20. 1878. West Florida, *Chapman* [in 1875].
Andropogon tetrastachyus var. *distachyus* Chapm., Fl. South. U.S. 581. 1860. No locality cited. [Type specimen of *A. arctatus* is also type of this.]
Sorghum arctatum Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon arctatus* Chapm.
(30) **Andropogon barbinodis** Lag., Gen. and Sp. Nov. 3. 1816. Mexico, *Sessé.*
Andropogon leucopogon Nees, Linnaea 19: 694. 1845. Mexico, *Aschenborn* 141.
Andropogon saccharoides var. *barbinodis* Hack., in DC., Monogr. Phan. 6: 494. 1889. Based on *A. barbinodis* Lag.
Andropogon saccharoides var. *leucopogon* Hack., in DC., Monogr. Phan. 6: 496. 1889. Based on *A. leucopogon* Nees.
Amphilophis barbinodis Nash, in Small, Fl. Southeast. U.S. 65. 1903. Based on *Andropogon barbinodis* Lag.
Holcus saccharoides var. *barbinodis* Hack.; Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon barbinodis* Lag.
Amphilophis leucopogon Nash, N.Amer. Fl. 17: 126. 1912. Based on *Andropogon leucopogon* Nees.
(21) **Andropogon brachystachyus** Chapm., Fl. South. U.S. ed. 2. 668. 1883. [Jacksonville], Fla., *Curtiss* [3632].
Sorghum brachystachyum Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon brachystachyus* Chapm.
(14) **Andropogon cabanisii** Hack., Flora 68: 133. 1885. "Pennsylvania" [erroneous] and Florida, *Cabanis.*
Sorghum cabanisii Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon cabanisii* Hack.
(27) **Andropogon campyloracheus** Nash, Bull. N.Y. Bot. Gard. 1: 431. 1900. Eustis, Fla., *Nash* 1738.
Andropogon elliottii var. *laxiflorus* Scribn., Bull. Torrey Bot. Club 23: 146. 1896 (Apr.). Eustis, Fla., *Nash* 1738. Published as new in Beal, Grasses N.Amer. 2: 51. 1896 (Nov.), *Nash* 1597 cited as type.
(22) **Andropogon capillipes** Nash, Bull. N.Y. Bot. Gard. 1: 431. 1900. Based on *A. virginicus* var. *glaucus* Hack.
Andropogon glaucus Muhl., Descr. Gram. 278. 1817. Not *A. glaucus* Retz., 1789. South Carolina.
Cymbopogon glaucus Schult., Mant. 2: 459. 1824. Based on *Andropogon glaucus* Muhl.
Andropogon virginicus var. *glaucus* Hack., in DC., Monogr. Phan. 6: 411. 1889. [Jacksonville], Fla., *Curtiss* 3638b.
(5) **Andropogon cirratus** Hack., Flora 68: 119. 1885. El Paso, Tex., *Wright* 804 [error for 805].
Sorghum cirratum Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon cirratus* Hack.
Schizachyrium cirratum Woot. and Standl., N.Mex. Coll. Agr. Bull. 81: 30. 1912. Based on *Andropogon cirratus* Hack.
(10) **Andropogon divergens** (Hack.) Anderss.; Hitchc., Jour. Wash. Acad. Sci. 23: 456. 1933. Based on *A. scoparius* subsp. *maritimus* var. *divergens* Hack.
Andropogon scoparius subsp. *maritimus* var. *divergens* Hack., in DC., Monogr. Phan. 6: 385. 1889. Texas.
Andropogon divergens Anderss.; Hack., in DC., Monogr. Phan. 6: 385. 1889, as synonym of *A. scoparius* subsp. *maritimus* var. *divergens* Hack.
(25) **Andropogon elliottii** Chapm., Fl. South. U.S. 581. 1860. Florida to North Carolina. Chapman erroneously cites "*A. argenteus* Ell., not of DC." but his description, especially of the "dilated clustered sheaths" shows that he did not know Elliott's species (see synonymy under *A. ternarius*

Michx.), but was describing plants of his own collection, one of which from Chapman's herbarium named "*Andropogon Elliottii* S. Fl." in his script is in the U.S. National Herbarium.

Andropogon clandestinus Wood, Class-book ed. 3: 809. 1861. Not *A. clandestinus* Nees, 1854. Western Louisiana.

Andropogon elliottii var. *gracilior* Hack., in DC., Monogr. Phan. 6: 415. 1889. [Jacksonville], Fla., *Curtiss* 3636a.

Sorghum elliottii Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *A. elliottii* Chapm.

?*Andropogon gyrans* Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 113. 1898. Durham County, N.C., *Ashe.*

Andropogon gracilior Nash, in Small, Fl. Southeast. U.S. 63. 1903. Based on *A. elliottii* var. *gracilior* Hack.

(32) **Andropogon exaristatus** (Nash) Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Amphilophis exaristatus* Nash.

Andropogon saccharoides var. *submuticus* Vasey; Hack., in DC., Monogr. Phan. 6: 495. 1889. Not *A. submuticus* Steud., 1854. Texas, *Nealley.*

Amphilophis exaristatus Nash, in Small, Fl. Southeast. U.S. 65. 1903. Based on *Andropogon saccharoides* var. *submuticus* Vasey.

(17) **Andropogon floridanus** Scribn., Bull. Torrey Bot. Club 23: 145. 1896. [Eustis], Fla., *Nash* 1572.

Andropogon bakeri Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 39. 1901. Grasmere, Fla., *C. H. Baker* 58.

(11) **Andropogon furcatus** Muhl., in Willd., Sp. Pl. 4: 919. 1806. North America [probably Pennsylvania].

?*Andropogon ternarius* [Michx. misapplied by] Bertol., Mem. Accad. Sci. Bologna 2: 600. 1850. Alabama.

Andropogon provincialis subvar. *furcatus* Hack., in DC., Monogr. Phan. 6: 442. 1889. Based on *A. furcatus* Muhl.

Andropogon provincialis subvar. *lindheimeri* Hack., in DC., Monogr. Phan. 6: 443. 1889. Texas, *Lindheimer* 741.

Andropogon provincialis subvar. *pycnanthus* Hack., in DC., Monogr. Phan. 6: 443. 1889. Texas, *Vinzent* 69.

Andropogon provincialis var. *tennesseensis* Scribn., Tenn. Agr. Expt. Sta. Bull. 7^2: 23. 1894. Tennessee.

Andropogon hallii grandiflorus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 5: 21. 1897. Colorado, *Shear* 747 [type], 605, 2366.

Andropogon tennesseensis Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 16: 1. 1899. Based on *A. provincialis* var. *tennesseensis* Scribn.

The name *Andropogon provincialis* Lam. (Encycl. 1: 376. 1783), was applied to this species by Hackel (in DC., Monogr. Phan. 6: 441. 1889) and others, but Lamarck's species is uncertain. He states that he saw a plant in the Paris Botanical Garden, but his description is taken from Gerard (Fl. Gall. Prov. 107. pl. 4. 1761) and does not well apply to our species. Furthermore, *A. provincialis* Retz. (Obs. Bot. 3: 43. [31]. 1783), which appears to be a species of *Chloris*, was published the same year. The author is unable to determine which is the earlier. The part of Lamarck's Encyclopedie containing page 376 appeared in August 1783.

(24) **Andropogon glomeratus** (Walt.) B.S.P., Prel. Cat. N.Y. 67. 1888. Based on *Cinna glomerata* Walt.

Cinna glomerata Walt., Fl. Carol. 59. 1788. South Carolina.

Andropogon macrourus Michx., Fl. Bor. Amer. 1: 56. 1803. Carolina to Florida, *Michaux.* [Type labeled "Virginia to Carolina."]

Andropogon spathaceus Trin., Fund. Agrost. 186. 1820, name only; Steud., Nom. Bot. ed. 2. 1: 93. 1840, as synonym of *A. macrourus* Michx.

Anatherum macrourum Griseb., Mem. Amer. Acad. (n.s.) 8: 534. 1863. Based on *Andropogon macrourus* Michx.

Andropogon macrourus var. *abbreviatus* Hack., in DC., Monogr. Phan. 6: 408. 1889. [Pleasant Bridge], N.J., *Gray.*

Andropogon macrourus var. *corymbosus* Chapm.; Hack., in DC., Monogr. Phan. 6: 409. 1889. [Jacksonville], Fla., *Curtiss* 3639c.

Sorghum glomeratum Kuntze, Rev. Gen. Pl. 2: 790. 1891. Based on *Cinna glomerata* Walt.

Dimeiostemon macrurus Raf.; Jacks., Ind. Kew. 2: 760. 1893, as synonym of *Andropogon macrourus* Michx.

Andropogon virginicus var. *corymbosus* Beal, Grasses N.Amer. 2: 52. 1896. [Jacksonville], Fla., *Curtiss* 3639c.

Andropogon glomeratus var. *corymbosus* Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7 (ed. 3): 15. 1900. Based on *A. macrourus* var. *corymbosus* Chapm.
Andropogon glomeratus var. *abbreviatus* Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7 (ed. 3): 15. 1900. Based on *A. macrourus* var. *abbreviatus* Hack.
Andropogon corymbosus Nash, in Britton, Man. 69. 1901. Based on *A. macrourus* var. *corymbosus* Chapm.
Andropogon corymbosus abbreviatus Nash, in Britton, Man. 70. 1901. Based on *A. macrourus* var. *abbreviatus* Hack.
Andropogon glomeratus tenuispatheus Nash, in Small, Fl. Southeast. U.S. 61. 1903. Florida [type] to New Mexico.
Andropogon tenuispatheus Nash, N.Amer. Fl. 17: 113. 1912. Based on *A. glomeratus tenuispatheus* Nash.

(1) **Andropogon gracilis** Spreng., Syst. Veg. 1: 284. 1825. Hispaniola.
Andropogon juncifolius Desv.; Hamilt., Prodr. Pl. Ind. Occ. 9. 1825. St. Croix, Virgin Islands.
Andropogon louisianae Steud., Syn. Pl. Glum. 1: 383. 1854. Louisiana [doubtless erroneous].
Sorghum gracile Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon gracilis* Spreng.
Schizachyrium gracile Nash, in Small, Fl. Southeast. U.S. 60. 1903. Based on *Andropogon gracilis* Spreng.

(12) **Andropogon hallii** Hack., Sitzungsb. Akad. Wiss. Math. Naturw. (Wien) 89[1]: 127. 1884. North America [Nebraska], *Hall* and *Harbour* 651.
Andropogon hallii var. *flaveolus* Hack., Sitzungsb. Akad. Wiss. Math. Naturw. (Wien) 89[1]: 128. 1884. [Nebraska] *Hall* and *Harbour* 651.
Andropogon hallii var. *incanescens* Hack., Sitzungsb. Akad. Wiss. Math. Naturw. (Wien) 89[1]: 128. 1884. [Nebraska] *Hall* and *Harbour*.
Andropogon hallii var. *muticus* Hack., in DC., Monogr. Phan. 6: 444. 1889. Brighton, Colo., *Vasey*.
Sorghum hallii Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon hallii* Hack.
Andropogon geminatus Hack.; Beal, Grasses N.Amer. 2: 55. 1896. Texas, *Nealley*.
Andropogon hallii var. *bispicata* Vasey; Beal, Grasses N.Amer. 2: 55. 1896, as synonym of *A. geminatus* Hack.
Andropogon chrysocomus Nash, in Britton, Man. 70. 1901. Kansas [type, Stevens County, *Carleton* 343] and Texas.
Andropogon paucipilus Nash, in Britton, Man. 70. 1901. Montana and Nebraska [type, Whitman, *Rydberg* 1607].

(3) **Andropogon hirtiflorus** (Nees) Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Based on *Schizachyrium hirtiflorum* Nees.
Streptachne domingensis Spreng.; Schult., Mant. 2: 188. 1824. Not *Andropogon domingensis* Steud., 1821. Santo Domingo, *Bertero*.
Schizachyrium hirtiflorum Nees, Agrost. Bras. 334. 1829. Brazil, *Sellow*.
Aristida domingensis Kunth, Rév. Gram. 1: 62. 1829. Based on *Streptachne domingensis* Spreng.
Andropogon oligostachyus Chapm., Fl. South. U.S. 581. 1860. Middle Florida, *Chapman*.
Andropogon hirtiflorus var. *oligostachyus* Hack., in DC., Monogr. Phan. 6: 372. 1889. Based on *A. oligostachyus* Chapm.
Sorghum hirtiflorum Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Schizachyrium hirtiflorum* Nees.
Schizachyrium oligostachyum Nash, in Small, Fl. Southeast. U.S. 59. 1903. Based on *Andropogon oligostachyus* Chapm.
Schizachyrium domingense Nash, N.Amer. Fl. 17: 103. 1912. Based on *Streptachne domingensis* Spreng.
Andropogon domingensis F. T. Hubb., Amer. Acad. Sci. Proc. 49: 493. 1913. Not *A. domingensis* Steud., 1821. Based on *Streptachne domingensis* Spreng.
ANDROPOGON HIRTIFLORUS var. FEENSIS (Fourn.) Hack., in DC., Monogr. Phan. 6: 372. 1889. Based on *A. feensis* Fourn.
Andropogon feensis Fourn., Mex. Pl. 2: 62. 1886. Santa Fé, Mexico, *Bourgeau* 752.
Andropogon hirtiflorus var. *brevipedicellatus* Beal, Grasses N.Amer. 2: 44. 1896. Chihuahua, Mexico, *Pringle* 383.
Schizachyrium feense A. Camus, Ann. Soc. Linn. Lyon 70: 89. 1923. Based on *Andropogon feensis* Fourn.

(7) **Andropogon littoralis** Nash, in Britton, Man. 69. 1901. New York [type, Staten Island, *Nash* in 1894] and New Jersey.

Andropogon scoparius subsp. *euscoparius* Hack.; Beal, Grasses N.Amer. 2: 46. 1896. Cape May, N.J., *Burk* in 1881 (misprinted as 1888).

Andropogon scoparius var. *littoralis* Hitchc., Rhodora 8: 205. 1906. Based on *A. littoralis* Nash.

Schizachyrium littorale Bicknell, Bull. Torrey Bot. Club 35: 182. 1908. Based on *Andropogon littoralis* Nash.

(19) **Andropogon longiberbis** Hack., Flora 68: 131. 1885. Florida, *Garber* [in 1877].

Sorghum longiberbe Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon longiberbis* Hack.

(9) **Andropogon maritimus** Chapm., Fl. South. U.S. ed. 2: 668. 1883. West Florida, *Chapman.*

Andropogon scoparius subsp. *maritimus* Hack., in DC., Monogr. Phan. 6: 385. 1889. Based on *A. maritimus* Chapm.

Schizachyrium maritimum Nash, in Small, Fl. Southeast. U.S. 59. 1903. Based on *Andropogon maritimus* Chapm.

(13) **Andropogon mohrii** (Hack.) Hack.; Vasey, Contrib. U.S.Natl.Herb. 3: 11. 1892. Based on *A. liebmanni* subvar. *mohrii* Hack.

Andropogon liebmanni subvar. *mohrii* Hack., in DC., Monogr. Phan. 6: 413. 1889. Mobile, Ala., *Mohr* [in 1884].

Andropogon mohrii var. *pungensis* Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 114. 1898. Washington County, N.C., *Ashe.*

Andropogon nodosus (Willem.) Nash, N.Amer. Fl. 17: 122. 1912. Based on *Dichanthium nodosum* Willem.

Dichanthium nodosum Willem., Ann. Bot. Usteri 18: 11. 1796. Mauritius.

Andropogon mollicomus Kunth, Rév. Gram. 1: 365. 1830. Mauritius.

Andropogon caricosus var. *mollicomus* Hack., in DC., Monogr. Phan. 6: 569. 1889. Based on *A. mollicomus* Kunth.

(20) **Andropogon perangustatus** Nash, in Small, Fl. Southeast. U.S. 62. 1903. Based on *A. virginicus* var. [*viridis* subvar.] *stenophyllus* Hack.

Andropogon virginicus var. *viridis* subvar. *stenophyllus* Hack., in DC., Monogr. Phan. 6: 411. 1889. Not *A. stenophyllus* Roem. and Schult., 1817. Florida, *Chapman* [in 1884].

(29) **Andropogon perforatus** Trin.; Fourn., Mex. Pl. 2: 59. 1886. [Mexico City] Mexico, *Berlandier* 641.

Andropogon emersus Fourn., Mex. Pl. 2: 58. 1886. Orizaba, Mexico, *Mueller* 2033.

Andropogon saccharoidcs var. *leucopogon* subvar. *perforatus* Hack., in DC., Monogr. Phan. 6: 496. 1889. Based on *A. perforatus* Trin.

Andropogon saccharoides var. *perforatus* Hack.; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 497. 1894. Presumably based on *A. perforatus* Trin.

Amphilophis perforatus Nash, in Small, Fl. Southeast. U.S. 66. 1903. Based on *Andropogon perforatus* Trin.

Holcus saccharoides var. *perforatus* Hack.; Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon perforatus* Trin.

Amphilophis emersus Nash, N.Amer. Fl. 17: 126. 1912. Based on *Andropogon emersus* Fourn.

(31) **Andropogon saccharoides** Swartz, Prodr. Veg. Ind. Occ. 26. 1788. Jamaica, *Swartz.*

Andropogon argenteus DC., Cat. Hort. Monsp. 77. 1813. Mexico, *Sessé.*

Andropogon laguroides DC., Cat. Hort. Monsp. 78. 1813. Grown from Mexican seed.

Andropogon glaucus Torr., Ann. Lyc. N.Y. 1: 153. 1824. Not *A. glaucus* Retz. 1789. Canadian River, Tex., *James.*

Trachypogon argenteus Nees, Agrost. Bras. 348. 1829. Based on *Andropogon argenteus* DC.

Trachypogon laguroides Nees, Agrost. Bras. 349. 1829. Based on *Andropogon laguroides* DC.

Andropogon torreyanus Steud., Nom. Bot. ed. 2. 1: 93. 1840. Based on *A. glaucus* Torr.

Andropogon jamesii Torr., in Marcy, Expl. Red. Riv. 302. 1853. Based on *A. glaucus* Torr.

Andropogon saccharoides var. *laguroides* Hack., in Mart., Fl. Bras. 2^3: 293. 1883. Based on *A. laguroides* DC.

Andropogon saccharoides var. *torreyanus* Hack., in DC., Monogr. Phan. 6: 495. 1889. Based on *A. torreyanus* Steud.

Sorghum saccharoides Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon saccharoides* Swartz.

Andropogon saccharoides var. *glaucus* Scribn., Mem. Torrey Bot. Club 5: 28. 1894. Based on *A. glaucus* Torr.

Amphilophis torreyanus Nash, in Britton, Man. 71. 1901. Based on *Andropogon torreyanus* Steud.

Holcus saccharoides Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon saccharoides* Swartz.

Holcus saccharoides var. *laguroides* Hack.; Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon laguroides* DC.

Amphilophis saccharoides Nash, N.Amer. Fl. 17: 125. 1912. Based on *Andropogon saccharoides* Swartz.

Bothriochloa saccharoides Rydb., Brittonia 1: 81. 1931. Based on *Andropogon saccharoides* Swartz.

(6) **Andropogon scoparius** Michx., Fl. Bor. Amer. 1: 57. 1803. Carolina, *Michaux.*

Andropogon purpurascens Muhl., in Willd., Sp. Pl. 4: 913. 1806. North America [probably Pennsylvania, since the type was received from Muhlenberg].

Andropogon flexilis Bosc; Poir., in Lam., Encycl. Sup. 1: 583. 1810. North America, *Bosc* [type, Carolina].

Pollinia scoparia Spreng., Pl. Pugill. 2: 13. 1815. Based on *Andropogon scoparius* Michx.

Andropogon halei Wood, Class-book ed. 3. 809. 1861. [Louisiana, *Hale.*]

Andropogon scoparius subvar. *flexilis* Hack., in DC., Monogr. Phan. 6: 384. 1889. Based on *A. flexilis* Bosc.

Andropogon scoparius subvar. *caesia* Hack., in DC., Monogr. Phan. 6: 384. 1889. No locality cited. (Plants with pruinose sheaths.)

Andropogon scoparius subvar. *scrpentinus* Hack., in DC., Monogr. Phan. 6: 384. 1889. No locality cited. (Plants with strongly flexuous rachis.)

Andropogon scoparius subvar. *simplicior* Hack., in DC., Monogr. Phan. 6: 384. 1889. No locality cited. (Sparingly branching plants.)

Sorghum scoparium Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogan scoparius* Michx.

Andropogon scoparius polycladus Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 40. 1901. "Braidentown" (Bradenton), Fla., *Combs* 1298.

Andropogon scoparius villosissimus Kearney, in Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 41. 1901. Waynesboro, Miss., *Kearney* 136. (Foliage villous.)

Schizachyrium scoparium Nash, in Small, Fl. Southeast. U.S. 59. 1903. Based on *Andropogon scoparius* Michx.

Schizachyrium villosissimum Nash, in Small, Fl. Southeast. U.S. 59, 1326. 1903. Based on *Andropogon scoparius villosissimus* Kearney.

Schizachyrium acuminatum Nash, in Small, Fl. Southeast. U.S. 59. 1326. 1903. Starkville, Miss., *Tracy* in 1890. (Sessile spikelets 10 mm long.)

Andropogon scoparius var. *frequens* F. T. Hubb. Rhodora 19: 103. 1917. Block Island, R.I., *Fernald, Long,* and *Torrey* 8476.

Andropogon scoparius var. *glaucescens* House, N.Y. State Mus. Bull. 254: 68. 1924. West of Albany, N.Y. [*House* 3 in 1918].

ANDROPOGON SCOPARIUS var. NEOMEXICANUS (Nash) Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *A. neo-mexicanus* Nash.

Andropogon neo-mexicanus Nash, Bull. Torrey Bot. Club 25: 83. 1898. White Sands, Doña Ana County, N.Mex., *Wooton* [583] in 1897.

Schizachyrium neo-mexicanum Nash, N.Amer. Fl. 17: 107 1912. Based on *Andropogon neo-mexicanus* Nash.

(4) **Andropogon semiberbis** (Nees) Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Based on *Schizachyrium semiberbe* Nees.

Schizachyrium semiberbe Nees, Agrost. Bras. 336. 1829. Brazil, *Sellow.*

Andropogon vaginatus Presl, Rel. Haenk. 1: 336. 1830. Not *A. vaginatus* Ell., 1816. Mexico, *Haenke.*

Andropogon velatus Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Based on *A. vaginatus* Presl.

Andropogon semiberbis subvar. *pruinatus* Hack., in DC., Monogr. Phan. 6: 370. 1889. [Eau Gallie,] Fla., *Curtiss* 3633.

Andropogon tener Curtiss; Hack., in DC., Monogr. Phan. 6: 370. 1889. Not *A. tener* Kunth, 1830. As synonym of *A. semiberbis* subvar. *pruinatus* Hack.

Sorghum semiberbe Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Schizachyrium semiberbe* Nees.

Andropogon hirtiflorus var. *semiberbis* Stapf, in Dyer, Fl. Cap. 7: 337. 1898. Based on *A. semiberbis* Kunth.

(8) **Andropogon stolonifer** (Nash) Hitchc., Amer. Jour. Bot. 2: 299. 1915. Based on *Schizachyrium stoloniferum* Nash.
Schizachyrium stoloniferum Nash, in Small, Fl. Southeast. U.S. 59, 1326. 1903. Florida, *Chapman.*
Schizachyrium triaristatum Nash, in Small, Fl. Southeast. U.S. 60, 1326. 1903. Florida, *Chapman.*
(26) **Andropogon subtenuis** Nash, in Small, Fl. Southeast. U.S. 63. 1903. Biloxi, Miss., *Tracy* 2243.
(2) **Andropogon tener** (Nees) Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Based on *Schizachyrium tenerum* Nees.
Schizachyrium tenerum Nees, Agrost. Bras. 336. 1829. Brazil, *Sellow.*
Andropogon gracilis Presl, Rel. Haenk. 1: 336. 1830. Not *A. gracilis* Spreng. 1825. Peru, *Haenke.*
Andropogon preslii Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Based on *A. gracilis* Presl.
Andropogon leptophyllus Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 264. 1832. Based on *Schizachyrium tenerum* Nees.
Sorghum tenerum Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Schizachyrium tenerum* Nees.
(15) **Andropogon ternarius** Michx., Fl. Bor. Amer. 1: 57. 1803. Carolina, *Michaux.*
Andropogon argenteus Ell., Bot. S.C. and Ga. 1: 148. 1816. Not *A. argentues* DC., 1813. Presumably South Carolina.
Andropogon argyraeus Schult., Mant. 2: 450. 1824. Based on *A. argenteus* Ell.
Andropogon muhlenbergianus Schult., Mant. 2: 455. 1824. Based on Muhlenberg's *Andropogon* no. 4. North Carolina.
Andropogon belvisii Desv., Opusc. 67. 1831. No locality cited.
Sorghum argenteum Kuntze, Rev. Gen. Pl. 2: 790. 1891. Based on *Andropogon argenteus* Ell.
Andropogon argyraeus var. *tenuis* Vasey, Contrib. U.S.Natl.Herb. 3: 12. 1892. Texas [Dallas, *Reverchon* 1161].
Andropogon argyraeus macrus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 1: 20. 1895. [Jacksonville,] Fla., *Curtiss* 4952. Published as new by Scribner and Ball (Hackel given as author) U.S.Dept.Agr., Div. Agrost. Bull. 24: 39. 1900, *Tracy* 3891 cited as type.
Andropogon elliottii glaucescens Scribn., Bull. Torrey Bot. Club 23: 145. 1896. Eustis, Fla., *Nash* 473.
Andropogon scribnerianus Nash, Bull. N.Y.Bot.Gard. 1: 432. 1900. Based on *A. elliottii glaucescens* Scribn.
Andropogon mississippiensis Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 40. 1901. Biloxi, Miss., *Tracy* 3818.
(18) **Andropogon tracyi** Nash, Bull. N.Y.Bot.Gard. 1: 433. 1900. Columbus, Miss., *Tracy* 3083.
(23) **Andropogon virginicus** L., Sp. Pl. 1046. 1753. America. The type specimen bears no data indicating origin. Linnaeus had also a specimen from Gronovius, *Clayton* 460 from Virginia.
Cinna lateralis Walt., Fl. Carol. 59. 1788. South Carolina.
Andropogon dissitiflorus Michx., Fl. Bor. Amer. 1: 57. 1803. Carolina to Florida, *Michaux.*
Anatherum virginicum Spreng., Pl. Pugill. 2: 16. 1815. Based on *Andropogon virginicus* L.
Andropogon vaginatus Ell., Bot. S.C. and Ga. 1: 148. 1816. Presumably South Carolina.
Andropogon tetrastachyus Ell., Bot. S.C. and Ga. 1: 150. pl. 8. f. 4. 1816. Charleston, S.C.
Holcus virginicus Muhl.; Steud., Nom. Bot. ed. 2. 1: 773. 1840, as synonym of *Andropogon virginicus* L.
Andropogon eriophorus Scheele, Flora 27: 51. 1844. Not *A. eriophorus* Willd. 1806. Charles Town, W.Va.
?*Andropogon curtisianus* Steud., Syn. Pl. Glum. 1: 390. 1854. Carolina, *M. A. Curtis.* Referred by Hackel to *A. virginicus* var. *tetrastachyus.* Description does not well apply to any of our species.
Andropogon virginicus var. *vaginatus* Wood, Class-book 808. ed. 3. 1861. Based on *A. vaginatus* Ell.
Andropogon virginicus var. *viridis* Hack., in DC., Monogr. Phan. 6: 410. 1889. Group name for three subvarieties, 1. *genuinus* being *A. virginicus* L.
Andropogon virginicus var. *tetrastachyus* Hack., in DC., Monogr. Phan. 6: 411. 1889. Based on *A. tetrastachyus* Ell.

Sorghum virginicum Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon virginicus* L.

Dimeiostemon vaginatus Raf.; Jacks., Ind. Kew. 2: 760. 1893, as synonym of *Andropogon virginicus* L.

Dimeiostemon tetrastachys Raf.; Jacks., Ind. Kew. 2: 760. 1893, as synonym of *Andropogon virginicus* L.

ANDROPOGON VIRGINICUS var. GLAUCOPSIS (Ell.) Hitchc., Amer. Jour. Bot. 21: 139. 1934. Based on *A. macrourus* var. *glaucopsis* Ell.

Andropogon macrourus var. *glaucopsis* Ell., Bot. S.C. and Ga. 1: 150. 1816. Presumably South Carolina.

Andropogon glaucopsis Steud., Nom. Bot. ed. 2. 1: 91. 1840. Not *A. glaucopsis* Steud. 1854. Based on *A. macrourus* var. *glaucopsis* Ell. Published as new by Nash, in Small, Fl. Southeast. U.S. 62. 1903, same basis.

Andropogon virginicus var. *dealbatus* Mohr; Hack., in DC., Monogr. Phan. 6: 411. 1889. Mobile, Ala., *Mohr* [in 1894].

Andropogon glomeratus var. *glaucopsis* Mohr, Bull. Torrey Bot. Club 24: 21. 1897. Based on *A. macrourus* var. *glaucopsis* Ell.

ANDROPOGON VIRGINICUS var. HIRSUTIOR (Hack.) Hitchc., Jour. Wash. Acad. Sci. 23: 456. 1933. Based on *A. macrourus* var. *hirsutior* Hack.

Andropogon macrourus var. *hirsutior* Hack., in DC., Monogr. Phan. 6: 409. 1889. Mobile, Ala., *Mohr* [October 28, 1884].

Andropogon virginicus var. *viridis* subvar. *ditior* Hack., in DC., Monogr. Phan. 6: 411. 1889. [Jacksonville], Fla., *Curtiss* 3639d.

Andropogon macrourus var. *viridis* Curtiss; Hack., in DC., Monogr. Phan. 6: 411. 1889, as synonym of *A. virginicus* var. *ditior* Hack. Florida, *Curtiss* N.Amer. Pl. 3639d.

Andropogon macrourus var. *pumilus* Vasey, Bot. Gaz. 16: 27. 1891. [Seminole Cave, Val Verde County], western Texas, *Nealley* [256 in 1890].

Andropogon macrourus var. *viridis* Chapm.; Vasey, Contrib. U.S.Natl.Herb. 3: 11. 1892. Florida, *Chapman.*

Andropogon glomeratus var. *pumilus* Vasey; L. H. Dewey, Contrib. U.S.Natl. Herb. 2: 496. 1894. Presumably based on *A. macrourus* var. *pumilus* Vasey.

Andropogon glomeratus var. *hirsutior* Mohr, Bull. Torrey Bot. Club 24: 21. 1897. Based on *A. macrourus* var. *hirsutior* Hack.

(28) **Andropogon wrightii** Hack., Flora 68: 139. 1885. [Silver City,] N.Mex., *Wright* 2104.

Sorghum wrightii Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon wrightii* Hack.

Amphilophis wrightii Nash, N.Amer. Fl. 17: 124. 1912. Based on *Andropogon wrightii* Hack.

(119) ANTHAENANTIA Beauv.

(1) **Anthaenantia rufa** (Ell.) Schult., Mant. 2: 258. 1824. Based on *Aulaxanthus rufus* Ell.

Aulaxanthus rufus Ell., Bot. S.C. and Ga. 1: 103. 1816. South Carolina.

Aulaxia rufa Nutt., Gen. Pl. 1: 47. 1818. Based on *Aulaxanthus rufus* Ell.

Panicum rufum Kunth, Rév. Gram. 1: 35. 1829. Based on *Aulaxanthus rufus* Ell.

Monachne rufa Bertol., Mem. Accad. Sci. Bologna 2: 596. pl. 41. f. 1. 1850. Based on *Panicum rufum* Kunth.

Leptocoryphium drummondii C. Muell., Bot. Ztg. 19: 314. 1861. Louisiana, *Drummond.*

Panicum ciliatiflorum var. *rufum* Wood, Amer. Bot. and Flor. pt. 2: 392. 1870. [Southern States.]

Panicum aulaxanthus Kuntze, Rev. Gen. Pl. 3^2: 361. 1898. Based on *Aulaxanthus rufus* Ell.

Anthaenantia rufa scabra Nash, in Small, Fl. Southeast. U.S. 79. 1903. South Carolina to Louisiana.

(2) **Anthaenantia villosa** (Michx.) Beauv., Ess. Agrost. 48, 151. pl. 10. f. 7. 1812. Based on *Phalaris villosa* Michx.

Phalaris villosa Michx., Fl. Bor. Amer. 1: 43. 1803. Carolina, *Michaux.*

Aulaxanthus ciliatus Ell., Bot. S.C. and Ga. 1: 102. 1816. South Carolina.

Panicum erianthum Poir., Encycl. Sup. 4: 284. 1816. Carolina, *Bosc.*

Panicum hirticalycinum Bosc; Roem. and Schult., Syst. Veg. 2: 468. 1817, as synonym of *Anthaenantia villosa* Beauv.

Aulaxia ciliata Nutt., Gen. Pl. 1: 47. 1818. Based on *Aulaxanthus ciliatus* Ell.
Panicum hirticalycum Bosc; Spreng., Syst. Veg. 1: 315. 1825, as synonym of *P. crianthum* Poir.
Oplismenus erianthos Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum erianthum* Poir.
Panicum ignoratum Kunth, Rév. Gram. 2: 217. pl. 20. 1830. Based on *Phalaris villosa* Michx.
Leptocoryphium obtusum Steud., Syn. Pl. Glum. 1: 34. 1854. Louisiana, *Riehl.*
Panicum ciliatiflorum Wood, Class-book pt. 2: 786. 1861. Not *P. ciliatiflorum* Kunth, 1829. Southern States.
Panicum anthaenantia Kuntze, Rev. Gen. Pl. 3^2: 361. 1898. Based on *Anthaenantia villosa* Beauv.

ANTHEPHORA Schreb.

Anthephora hermaphrodita (L.) Kuntze, Rev. Gen. Pl. 2: 759. 1891. Based on *Tripsacum hermaphroditum* L.
Tripsacum hermaphroditum L., Syst. Nat. ed. 10. 2: 1261. 1759. Jamaica.
Anthephora elegans Schreb., Beschr. Gräs. 2: 105. pl. 44. 1810. Jamaica.

(33) ANTHOCHLOA Nees

(1) **Anthochloa colusana** (Davy) Scribn., U.S. Dept. Agr., Div. Agrost. Bull. 17: 221. f. 517. 1899. Based on *Stapfia colusana* Davy.
Stapfia colusana Davy, Erythea 6: 110. pl. 3. 1898. Colusa County, Calif., *Davy.*
Neostapfia colusana Davy, Erythea 7: 43. 1899. Based on *Stapfia colusana* Davy.
Davyella colusana Hack., Oesterr. Bot. Ztschr. 49: 134. 1899. Based on *Stapfia colusana* Davy.

(109) ANTHOXANTHUM L.

(2) **Anthoxanthum aristatum** Boiss., Voy. Bot. Esp. 2: 638. 1845. Southern Europe.
Anthoxanthum puelii Lec. and Lam., Cat. Pl. France 385. 1847. France.
Anthoxanthum odoratum var. *puelii* Coss. and Dur., Expl. Sci. Alger. 2: 21. 1854. Based on *A. puelii* Lec. and Lam.
Anthoxanthum gracile Bivon., Stirp. Rar. Sic. 1: 13. pl. 1. f. 2. 1813. Italy.
(1) **Anthoxanthum odoratum** L., Sp. Pl. 28. 1753. Europe.
Anthoxanthum odoratum var. *altissimum* Eaton and Wright, Man. Bot. North. States 10. 1817. Probably Connecticut, *Ives.*
Xanthonanthos odoratum St. Lag., Ann. Soc. Bot. Lyon 7: 119. 1880. Based on *Anthoxanthum odoratum* L.

(85) ARISTIDA L.

(14) **Aristida adscensionis** L., Sp. Pl. 82. 1753. Ascension Island.
Aristida interrupta Cav., Icon. Pl. 5: 45. pl. 471. f. 2. 1799. Mexico.
Chaetaria ascensionis Beauv., Ess. Agrost. 30, 151, 158. 1812. Based on *A. adscensionis* L.
Aristida bromoides H.B.K., Nov. Gen. and Sp. 1: 122. 1816. Ecuador, *Humboldt* and *Bonpland.*
Aristida coarctata H.B.K., Nov. Gen. and Sp. 1: 122. 1816. Mexico, *Humboldt* and *Bonpland.*
Chaetaria bromoides Roem. and Schult., Syst. Veg. 2: 396. 1817. Based on *Aristida bromoides* H.B.K.
Chaetaria coarctata Roem. and Schult., Syst. Veg. 2: 396. 1817. Based on *Aristida coarctata* H.B.K.
Aristida fasciculata Torr., Ann. Lyc. N.Y. 1: 154. 1824. Canadian River [Texas or Oklahoma], *James.*
Chaetaria fasciculata Schult., Mant. 3 (Add. 1): 578. 1827. Based on *Aristida fasciculata* Torr.
Aristida nigrescens Presl, Rel. Haenk. 1: 223. 1830. Mexico, *Haenke.*
Aristida dispersa Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5^1: 129. 1842. Chile.

Aristida dispersa var. *bromoides* Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 130. 1842. Based on *A. bromoides* H.B.K.

Aristida dispersa var. *coarctata* Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 130. 1842. Based on *A. coarctata* H.B.K.

Aristida maritima Steud., Syn. Pl. Glum. 1: 137. 1854. Guadeloupe.

Aristida schaffneri Fourn., Mex. Pl. 2: 78. 1886. Mexico, *Schaffner.*

Aristida grisebachiana Fourn., Mex. Pl. 2: 78. 1886. Mexico, *Schaffner* 175 in part, 53.

Aristida grisebachiana var. *decolorata* Fourn., Mex. Pl. 2: 78. 1886. Mexico, *Liebmann* 663, 664.

Aristida adscensionis var. *coarctata* Kuntze, Rev. Gen. Pl. 3: 340. 1898. Based on *A. coarctata* H.B.K.

Aristida americana bromoides Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 5. 1901. Based on *A. bromoides* H.B.K.

Aristida debilis Mez, Repert. Sp. Nov. Fedde 17: 151. 1921. Venezuela, *Moritz* [638]. [*Moritz* 1522 named *A. debilis* by Mez is different. It has been named *A. moritzii* Henr.] Jamaica, *MacNab.*

Aristida adscensionis var. *bromoides* Henr., Med. Rijks Herb. Leiden 54: 62. 1926. Based on *A. bromoides* H.B.K.

Aristida adscensionis var. *mexicana* Hack.; Henr., Med. Rijks Herb. Leiden 54A: 265. 1927, as synonym of *A. adscensionis.* Morelia, Mexico, *Arsène.*

(34) **Aristida affinis** (Schult.) Kunth, Rév. Gram. 1: 61. 1829. Based on *Chaetaria affinis* Schult.

Aristida racemosa Muhl., Descr. Gram. 172. 1817. Not *A. racemosa* Spreng., 1807. Presumably Pennsylvania.

Chaetaria affinis Schult., Mant. 2: 210. 1824. Based on *Aristida racemosa* Muhl.

Aristida purpurascens var. *alabamensis* Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 102. 1842. Alabama.

Aristida virgata var. *palustris* Chapm., Fl. South. U.S. 555. 1860. Western Florida.

Aristida palustris Vasey, Descr. Cat. Grasses U.S. 35. 1885. Based on *A. virgata* var. *palustris* Chapm.

(29) **Aristida arizonica** Vasey, Bull. Torrey Bot. Club 13: 27. 1886. Arizona [*Rusby* 875; but the specimen bearing the name and diagnosis in Vasey's script was collected by G. R. Vasey at Las Vegas, N.Mex.].

(16) **Aristida barbata** Fourn., Mex. Pl. 2: 78. 1886. Valley of Mexico, *Schaffner* 513.

Aristida havardii Vasey, Bull. Torrey Bot. Club 13: 27. 1886. Western Texas, *Havard* [28]. The date of publication is assumed to be subsequent to that of *A. barbata.*

(8) **Aristida basiramea** Engelm.; Vasey, Bot. Gaz. 9: 76. 1884. Minneapolis, Minn., *Upham.*

(3) **Aristida californica** Thurb.; S. Wats., Bot. Calif. 2: 289. 1880. California, Colorado Desert, *Schott;* Fort Mohave, *Cooper.*

Aristida jonesii Vasey, Contrib. U.S. Natl. Herb. 3: 48. 1892, as synonym of *A. californica.* [The Needles, Calif., *Jones* 68a.]

Aristida californica var. *fugitiva* Vasey, Contrib. U.S. Natl. Herb. 3: 49. 1892. Colorado Desert, California, *Orcutt* [1486].

(39) **Aristida condensata** Chapm., Bot. Gaz. 3: 19. 1878. Florida [Apalachicola, *Chapman*].

Aristida stricta var. *condensata* Vasey, Contrib. U.S. Natl. Herb. 3: 45. 1892. Based on *A. condensata* Chapm.

Aristida combsii Scribn. and Ball, U.S.Dept. Agr., Div. Agrost. Bull. 24: 43. f. 17. 1901. Grasmere, Fla., *Combs* and *Baker* 1069.

Aristida condensata var. *combsii* Henr., Med. Rijks Herb. Leiden 54: 108. 1926. Based on *A. combsii* Scribn. and Ball.

(10) **Aristida curtissii** (A. Gray) Nash, in Britton, Man. 94. 1901. Based on *A. dichotoma* var. *curtissii* A. Gray.

Aristida dichotoma var. *curtissii* A. Gray, Man. ed. 6. 640. 1890. [Bedford County, Va., *Curtiss.*]

(1) **Aristida desmantha** Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 109. 1842. Texas, *Drummond* 285 [type], 333.

(9) **Aristida dichotoma** Michx., Fl. Bor. Amer. 1: 41. 1803. Lincoln, N.C., *Michaux.*

Curtopogon dichotomus Beauv., Ess. Agrost. 32, 159. pl. 8, f. 7. 1812. Based on *Aristida dichotoma* Michx.

Cyrtopogon dichotomus Spreng., Syst. Veg. 1: 266. 1825. Based on *Aristida dichotoma* Michx.

Avena setacea Muhl.; Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 87. 1830. Not *A. setacea* Vill., 1787. As synonym of *Aristida dichotoma* Michx.

Avena paradoxa Willd.; Kunth, Enum. Pl. 1: 188. 1833, as synonym of *Aristida dichotoma* Michx.

(17) **Aristida divaricata** Humb. and Bonpl.; Willd., Enum. Pl. 1: 99. 1809. Mexico, *Humboldt* and *Bonpland.*

Chaetaria divaricata Beauv., Ess. Agrost. 30, 158. 1812. Based on type of *Aristida divaricata* Humb. and Bonpl.

Aristida humboldtiana Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 118. 1842. Based on type of *A. divaricata* Humb. and Bonpl.

Aristida palmeri Vasey, Bull. Torrey Bot. Club 10: 42. 1883. Southern Arizona, *Palmer.*

Aristida lemmoni Scribn., N.Y. Acad. Sci. Trans. 14: 23. 1894. Arizona [Fort Huachuca, *Wilcox*].

(27) **Aristida fendleriana** Steud., Syn. Pl. Glum. 1: 420. 1855. New Mexico, *Fendler* 973.

Aristida purpurea var. *fendleri* Vasey, Cat. Pl. Survey W. 100th Merid. 55. 1874. Name only.

Aristida purpurea var. *fendleriana* Vasey, Contrib. U.S. Natl. Herb. 3: 46. 1892. Based on *A. fendleriana* Steud.

Aristida fasciculata var. *fendleriana* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 515. 1894. Based on *A. fendleriana* Steud.

Aristida longiseta fendleriana Merr., U.S. Dept. Agr., Div. Agrost. Circ. 34: 5. 1901. Based on *A. fendleriana* Steud.

Aristida subuniflora Nash, in Small, Fl. Southeast. U.S. 116. 1903. New Mexico, *Vasey.*

(6) **Aristida floridana** (Chapm.) Vasey, Descr. Cat. Grasses U.S. 35. 1885. Based on *Streptachne floridana* Chapm.

Streptachne floridana Chapm., Fl. South. U.S. 554. 1860. South Florida, *Blodgett.*

Ortachne floridana Nash, in Small, Fl. Southeast. U.S. 119. 1903. Based on *Streptachne floridana* Chapm.

(4) **Aristida glabrata** (Vasey) Hitchc., Contrib. U.S. Natl. Herb. 22: 522. 1924. Based on *A. californica* var. *glabrata* Vasey.

Aristida californica var. *major* Vasey, Calif. Acad. Sci. Proc. II. 2: 212. 1889. Name only [Magdalena Island, *Brandegee* in 1889].

Aristida californica var. *glabrata* Vasey, Calif. Acad. Sci. Proc. II. 3: 178. 1891. San José del Cabo, Baja California, [*Brandegee* 34 in 1890].

(22) **Aristida glauca** (Nees) Walp., Ann. Bot. [London] 1: 925. 1849. Based on *Chaetaria glauca* Nees.

Chaetaria glauca Nees, Linnaea 19: 688. 1847. Mexico, *Aschenborn* 251.

Aristida reverchoni Vasey, Bull. Torrey Bot. Club 13: 52. 1886. Crockett County, Tex., *Reverchon.*

Aristida stricta var. *nealleyi* Vasey, Contrib. U.S. Natl. Herb. 1: 55. 1890. Chenate Mountains, Tex., *Nealley* [709].

Aristida nealleyi Vasey, Contrib. U.S. Natl. Herb. 3: 45. 1892. Based on *A. stricta* var. *nealleyi* Vasey.

Aristida reverchoni var. *augusta* [error for *angusta*] Vasey, Contrib. U.S. Natl. Herb. 3: 46. 1892. Comanche Peak, Tex., *Reverchon.*

Aristida vaseyi Woot. and Standl., N.Mex. Coll. Agr. Bull. 81: 55. 1912. Based on *A. reverchoni* var. *augusta* Vasey.

(40) **Aristida gyrans** Chapm., Bot. Gaz. 3: 18. 1878. Roberts Key, Caximbas Bay, Fla. [*Chapman*].

(18) **Aristida hamulosa** Henr., Med. Rijks Herb. Leiden 54: 219. 1926. Tucson, Ariz., *Toumey.*

Aristida humboldtiana var. *minor* Vasey, Contrib. U.S. Natl. Herb. 3: 47. 1892. Texas [*Nealley*].

Aristida imbricata Henr., Med. Rijks Herb. Leiden 54A: 253. 1927. El Paso, Tex., *Griffiths* 7433.

Aristida gentilis var. *breviaristata* Henr., Med. Rijks Herb. Leiden 54A: 255. 1927. Santa Rita Mountains, Ariz., *Griffiths* 7270.

(15) **Aristida intermedia** Scribn. and Ball, U.S. Dept. Agr., Div. Agrost. Bull. 24: 44. f. 18. 1901. Biloxi, Miss., *Kearney* 204.

(28) **Aristida lanosa** Muhl.; Ell., Bot. S.C. and Ga. 1: 143. 1816. South Carolina.

Aristida lanata Poir., in Lam., Encycl. Sup. 1: 453. 1810. Not *A. lanata* Forsk., 1775. Carolina, *Bosc.*

Aristida gossypina Bosc; Beauv., Ess. Agrost. 30, 152. 1812. Name only.

Chaetaria gossypina Bosc; Beauv., Ess. Agrost. 30, 152, 158. 1812. Name only; Roem. and Schult., Syst. Veg. 2: 391. 1817. Based on *Aristida lanata* Poir.

Aristida lanuginosa Bosc; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2[1]: 46. 1836, name only; Clarion in Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 103. 1842. North America, *Bosc.*

Moulinsia lanosa Raf.; Jacks., Ind. Kew. 3: 267. 1894, as synonym of *Aristida lanosa* Muhl.

(13) **Aristida longespica** Poir., in Lam., Encycl. Sup. 1: 452. 1810. Carolina, *Bosc.*

Aristida gracilis Ell., Bot. S.C. and Ga. 1: 142. pl. 8. f. 3. 1816. Charleston, S.C.

Aristida geniculata Raf., Amer. Monthly Mag. 2: 119. 1817. Long Island, N.Y.

Curtopogon gracilis Nees; Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 101. 1842, as synonym of *Aristida gracilis* Ell.

Aristida gracilis var. *depauperata* A. Gray, Man. ed. 5. 618. 1867. Philadelphia, *Smith.*

Aristida simplicifolia [error for *simpliciflora*] var. *texana* Vasey, Contrib. U.S. Natl. Herb. 3: 44. 1892. Texas, [Marshall, *Riggs* 79].

Trixostis gracilis Raf.; Jacks., Ind. Kew. 4: 1131. 1895, as synonym of *Aristida gracilis* Ell.

Aristida longespica var. *geniculata* Fernald, Rhodora 35: 318. 1933. Based on *A. geniculata* Raf.

(26) **Aristida longiseta** Steud., Syn. Pl. Glum. 1: 420. 1855. New Mexico, *Fendler* 978.

Aristida curtiseta Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1863. Northern Texas [*Buckley.* Spikelets of type aborted by smut]. (Erroneously given in Index Kewensis as *A. breviseta.*)

Aristida purpurea var. *longiseta* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 286. 1878. Based on *A. longiseta* Steud.

Aristida fasciculata var. *nuttallii* Thurb.; Beal, Grasses N.Amer. 2: 208. 1896. Based on *A. longiseta* Steud., though Thurber's name probably referred to *A. pallens* as used by Nuttall.

Aristida longiseta var. rariflora Hitchc., Contrib. U.S. Natl. Herb. 22: 565. 1924. Tom Green County, Tex., *Tweedy.* (Published as *A. longiseta rariflora.*)

Aristida rariflora Henr., Med. Rijks Herb. Leiden 54A: 314. 1927. Based on *A. longiseta rariflora* Hitchc.

Aristida longiseta var. robusta Merr., U.S.Dept.Agr., Div. Agrost. Circ. 34: 5. 1901. Indian Creek, Mont., *Scribner* 336. (Published as *A. longiseta robusta.*)

Aristida purpurea robusta Piper, Contrib. U.S. Natl. Herb. 11: 107. 1906. Based on *A. longiseta robusta* Merr.

(37) **Aristida mohrii** Nash, Bull. N.Y. Bot. Gard. 1: 436. 1900. Spring Hill, near Mobile, Ala., *Mohr.*

(11) **Aristida oligantha** Michx., Fl. Bor. Amer. 1: 41. 1803. Illinois, *Michaux.*

?*Aristida adscensionis* [L. misapplied by] Walt., Fl. Carol. 74. 1788. South Carolina.

Chaetaria olygantha Beauv., Ess. Agrost. 30, 158. 1812. Based on *Aristida oligantha* Michx.

Aristida pallens [Cav. misapplied by] Nutt., Gen. Pl. 1: 51. 1818. Fort Mandan, N.Dak. [*Nuttall*].

Aristida micropoda Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 107. 1842. Arkansas, *Beyrich.*

Aristida macrochaeta Steud., Syn. Pl. Glum. 1: 134. 1854. Virginia, *M. A. Curtis.*

Aristida pauciflora Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1863. Northern Texas [*Buckley*].

Aristida oligantha var. *nervata* Beal, Grasses N.Amer. 2: 202. 1896. Grants Pass, Oreg., *Howell.*

[16] Med. Rijks Herb. Leiden 54A: 439. 1927. (Critical Revis. Aristida.)

(7) **Aristida orcuttiana** Vasey, Bull. Torrey Bot. Club 13: 27. 1886. Hansen's Ranch, Baja California, *Orcutt* [507].

Aristida hypomegas Mez, Repert. Sp. Nov. Fedde 17: 146. 1921. New Mexico, *Bigelow* [34].

This species has been referred to *A. schiediana* Trin. and Rupr., a Mexican species not known from the United States.

(20) **Aristida pansa** Woot. and Standl., Contrib. U.S.Natl.Herb. 16: 112. 1913. Tortugas Mountain, N.Mex., *Wooton.*

(33) **Aristida parishii** Hitchc., in Jepson, Fl. Calif. 1: 101. 1912. Agua Caliente, Calif., *Parish Brothers* 1029a.

(19) **Aristida patula** Chapm.; Nash, Bull. Torrey Bot. Club 23: 98. 1896. Based on *A. scabra* as described by Chapman (Fl. South. U.S. ed. 2. 663. 1883), not Kunth. Florida, *Chapman.*

(32) **Aristida purpurascens** Poir., in Lam., Encycl. Sup. 1: 452. 1810. South Carolina, *Bosc.*

Chaetaria purpurascens Beauv., Ess. Agrost. 30, 152, 158. 1812. Based on *Aristida purpurascens* Poir.

Aristida elliottiana Steud., Syn. Pl. Glum. 1: 133. 1854. Based on *A. stricta* as described by Elliott, not Michx.

Aristida geyeriana Steud., Syn. Pl. Glum. 1: 133, 1854. Illinois, *Geyer.*

Aristida stricta Steud., Syn. Pl. Glum. 1: 133. 1854. Not *A. stricta* Michx., 1803. As synonym of *A. geyeriana* Steud. Illinois.

Aristida purpurascens var. *minor* Vasey, Contrib. U.S.Natl.Herb. 1: 46. 1892. [Horn Island, Miss., *Tracy* 1564.]

Aristida purpurascens glaucissima Kearney; Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 45. 1901. Biloxi, Miss., *Kearney* 321.

(23) **Aristida purpurea** Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 145. 1837. Red River, Ark. [*Nuttall*].

Aristida purpurea var. *hookeri* Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 107. 1842. Texas, *Drummond* 293.

Aristida purpurea var. *berlandieri* Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 107. 1842. Bejar [Bexar], Tex., *Berlandier* 1777.

Aristida aequiramea Scheele, Linnaea 22: 343. 1849. New Braunfels, Tex., *Lindheimer* [562].

Aristida filipendula Buckl., Acad. Nat. Sci., Phila. Proc. 1862: 93. 1863. Western Texas [*Buckley*, the locality being northern Texas].

Aristida purpurea var. *californi*[c]*a* Vasey, Contrib. U.S.Natl.Herb. 3: 47. 1892. California [Capay Valley, *Lemmon* 5474].

Aristida fasciculata var. *californica* Vasey; L. H. Dewey, Contrib. U.S.Natl. Herb. 2: 515. 1894. Presumably based on *A. purpurea* var. *californica* Vasey.

Aristida fasciculata var. *hookeri* L. H. Dewey, Contrib. U.S.Natl.Herb. 2: 515. 1894. Presumably based on *A. purpurea* var. *hookeri* Trin. and Rupr.

Aristida longiseta hookeri Merr., U.S.Dept.Agr., Div. Agrost. Circ. 34: 5. 1901. Based on *A. purpurea* var. *hookeri* Trin. and Rupr.

Aristida purpurea aequiramea Merr., U.S.Dept.Agr., Div. Agrost. Circ. 34: 7. 1901. Based on *A. aequiramea* Scheele.

Aristida purpurea capillarifolia Merr., U.S.Dept.Agr., Div. Agrost. Circ. 34: 8. 1901. Texas, *Nealley.*

Aristida berlandieri Hitchc., Contrib. U.S.Natl.Herb. 17: 280. 1913. Based on *A. purpurea* var. *berlandieri* Trin. and Rupr.

ARISTIDA PURPUREA var. LAXIFLORA Merr., U.S.Dept.Agr., Div. Agrost. Circ. 34: 8. 1901. Texas, *Reverchon* 12. (Published as *A. purpurea laxiflora.*)

(12) **Aristida ramosissima** Engelm.; A. Gray, Man. ed. 2. 550. 1856. Illinois, *Engelmann* [type] and Kentucky.

Aristida ramosissima var. *uniaristata* A. Gray, Man. ed. 5. 618. 1867. Odin, Ill., *Vasey.*

Aristida ramosissima var. *chaseana* Henr., Med. Rijks Herb. Leiden. 54B: 498. 1928. Lake Charles, La., *Chase* 4411.

(31) **Aristida rhizomophora** Swallen, Jour. Wash. Acad. Sci. 19: 196. f. 1. 1929. North of Lake Okeechobee, Fla., *Weatherwax* 1081.

(24) **Aristida roemeriana** Scheele, Linnaea 22: 343. 1849. New Braunfels, Tex., *Römer.*

Aristida muhlenbergioides Fourn., Mex. Pl. 2: 79. 1886. Mexico, *Virlet* 1424, *Karwinsky* 1008.

Aristida purpurea var. *micrantha* Vasey, Contrib. U.S.Natl.Herb. 3: 47. 1892. Western Texas [*Nealley*].
Aristida fasciculata var. *micrantha* Vasey; L. H. Dewey, Contrib. U.S.Natl. Herb. 2: 515. 1894. Presumably based on *A. purpurea* var. *micrantha* Vasey.
Aristida micrantha Nash, in Small, Fl. Southeast. U.S. 117. 1903. Based on *A. purpurea* var. *micrantha* Vasey.

(36) **Aristida simpliciflora** Chapm., Bot. Gaz. 3: 18. 1878. West Florida [*Chapman*].

(21) **Aristida spiciformis** Ell., Bot. S.C. and Ga. 1: 141. 1816. Presumably South Carolina.
Aristida stricta Muhl., Descr. Gram. 174. 1817. Not *A. stricta* Michx. 1803. Georgia.
Aristida squarrosa Trin., in Spreng., Neu. Entd. 2: 62. 1821. North America.
Chaetaria squarrosa Schult., Mant. 3 (Add. 1): 577. 1827. Based on *Aristida squarrosa* Trin.

(30) **Aristida stricta** Michx., Fl. Bor. Amer. 1: 41. 1803. South Carolina, *Michaux.*
Chaetaria stricta Beauv., Ess. Agrost. 30, 152, 158. 1812. Based on *Aristida stricta* Michx.
Aristida beyrichiana Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 104. 1842. Georgia and Arkansas, *Beyrich.*

(38) **Aristida tenuispica** Hitchc., Contrib. U.S.Natl.Herb. 22: 581. 1924. Hillsboro, Fla., *Combs* 1384.

(5) **Aristida ternipes** Cav., Icon. Pl. 5: 46. 1799. Panama, *Née.*
Streptachne scabra H.B.K., Nov. Gen. and Sp. 1: 124. pl. 40. 1815. Near Toluca, Mex., *Humboldt* and *Bonpland.*
Streptachne tenuis H.B.K., Nov. Gen. and Sp. 1: 124. 1815. Venezuela, *Humboldt* and *Bonpland.*
Aristida scabra Kunth, Rév. Gram. 1: 62. 1829. Based on *Streptachne scabra* H.B.K.
Aristida tenuis Kunth, Rév. Gram. 1: 62. 1829. Based on *Streptachne tenuis* H.B.K.
Stipa tenuis Willd., Steud., Nom. Bot. ed. 2. 2: 643. 1841, as synonym of *Aristida tenuis.*
Muhlenbergia scabra Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 183. 1842. Based on *Aristida scabra* Kunth.
Streptachne cubensis A. Rich., in Sagra, Hist. Cuba 11: 311. 1850. Cuba, *Sagra.*
Ortachne scabra Fourn., Bull. Soc. Bot. France 27: 295. 1880. Based on *Streptachne scabra* H.B.K.
Ortachne tenuis Fourn., Bull. Soc. Bot. France 27: 295. 1880. Based on *Streptachne tenuis* H.B.K.
Aristida ternipes var. minor (Vasey) Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. Based on *A. schiedeana* var. *minor* Vasey.
Aristida schiedeana var. *minor* Vasey, Bull. Torrey Bot. Club 13: 28. 1886. Arizona, *Pringle* [type]; Bowie, *Jones.*
Aristida divergens Vasey, Contrib. U.S. Natl. Herb. 3: 48. 1892. Based on *A. schiedeana* var. *minor* Vasey.
Aristida ternipes divergens Hitchc., Contrib. U.S. Natl. Herb. 22: 525. 1924. Based on *A. divergens* Vasey.

(2) **Aristida tuberculosa** Nutt., Gen. Pl. 1: 57. 1818. Near Augusta, Ga.
Chaetaria tuberculosa Schult., Mant. 2: 211. 1824. Based on *Aristida tuberculosa* Nutt.

(35) **Aristida virgata** Trin., in Spreng., Neu. Entd. 2: 60. 1821. North America [Philadelphia, Pa.].
Aristida stricta Steud., Nom. Bot. ed. 2. 1: 132. 1840. Not *A. stricta* Michx., 1803. As synonym of *A. virgata* Trin.
Aristida perennis Panz., in Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 104. 1842. South Carolina. (Fide Henrard.) [16]
Aristida gracilis var. *virgata* Wood, Amer. Bot. and Flor. pt. 2: 389. 1870. Presumably based on *A. virgata* Trin.
Aristida purpurascens var. *depauperata* Vasey; Beal, Grasses N. Amer. 2: 201. 1896. [Ocean Springs,] Miss., *Tracy* [107].
Aristida chapmaniana Nash, in Small, Fl. Southeast. U.S. 118, 1327. 1903. Apalachicola, Fla., *Chapman.*

(25) **Aristida wrightii** Nash, in Small, Fl. Southeast. U.S. 116. 1903. Dallas, Tex., *Reverchon* 1061.

(58) ARRHENATHERUM Beauv.

(1) **Arrhenatherum elatius** (L.) Mert. and Koch, in Roehl., Deut. Fl. 1: 546. 1823. Based on *Avena elatior* L.
Avena elatior L., Sp. Pl. 79. 1753. Europe.
Holcus avenaceus Scop., Fl. Carn. ed. 2. 2: 276. 1772. Based on *Avena elatior* L.
Avena elata Salisb., Prodr. Stirp. 23. 1796. Not *A. elata* Forsk., 1775. Based on *A. elatior* L.
Arrhenatherum avenaceum Beauv., Ess. Agrost. 55, 152, 164. pl. 11. f. 5. 1812. Based on *Holcus avenaceus* Scop.
Arrhenatherum americanum Beauv., Ess. Agrost. 56, 152, 1812. Name only.
Hordeum avenaceum Wigg.; Beauv., Ess. Agrost. 165. 1812. Name only, referred to *Arrhenatherum*. Steud., Nom. Bot. 413. 1821, as synonym of *Holcus avenaceus* Scop.
ARRHENATHERUM ELATIUS var. BULBOSUM (Willd.) Spenner, Fl. Friburg. 1: 113. 1825. Based on *Avena bulbosa* Willd.
Avena tuberosa Gilib., Exerc. Phyt. 2: 538. 1790. France.
Avena bulbosa Willd., Ges. Naturf. Freund. Berlin Neue Schrift. 2: 116. 1799. Switzerland.
Holcus bulbosus Schrad., Fl. Germ. 1: 248. 1806. Based on *Avena bulbosa* Willd.
Holcus avenaceus var. *bulbosus* Gaudin, Agrost. Helv. 1: 136. 1811. Based on *H. bulbosus* Schrad.
Avena elatior var. *bulbosa* St. Amans, Fl. Agen. 47. 1821. Based on *A. bulbosa* Willd.
Arrhenatherum tuberosum Schultz, Pollichia 20–21: 272. 1863. Based on *Avena tuberosa* Gilib.
Avena elatior var. *tuberosa* Aschers., Fl. Brand. 1: 826. 1864. Based on *A. tuberosa* Gilib.
Arrhenatherum elatius var. *tuberosum* Thiel., Bull. Soc. Bot. Belg. 12: 184. 1873. Based on *Avena tuberosa* Gilib.

(144) ARTHRAXON Beauv.

(1) ARTHRAXON HISPIDUS var. CRYPTATHERUS (Hack.) Honda, Bot. Mag. Tokyo 39: 277. 1925. Based on *A. ciliaris* subsp. *langsdorffii* var. *cryptatherus* Hack.
Arthraxon ciliaris subsp. *langsdorffii* var. *cryptatherus* Hack., in DC., Monogr. Phan. 6: 355. 1889. Japan.

(1) ARUNDINARIA Michx.

(1) **Arundinaria gigantea** (Walt.) Chapm., Fl. South. U.S. 561. 1860. Presumably based on *Arundo gigantea* Walt. That name is not cited, but *Arundinaria macrosperma* Michx. is cited as synonym.
Arundo gigantea Walt., Fl. Carol. 81. 1788. South Carolina.
Arundinaria macrosperma Michx., Fl. Bor. Amer. 1: 74. 1803. Banks of Mississippi, Carolina, Florida, *Michaux*.
Miegia macrosperma Pers., Syn. Pl. 1: 102. 1805. Based on *Arundinaria macrosperma* Michx.
Ludolfia macrosperma Willd., Ges. Naturf. Freund. Berlin Mag. 2: 320. 1808. Based on *Arundinaria macrosperma* Michx.
Miegia gigantea Nutt., Gen. Pl. 1: 39. 1818. "Alluvions of the Mississippi." Based (through Elliott) on *Arundo gigantea* Walt.
Arundinaria gigantea Nutt., Gen. Pl. 1: 39. 1818, as synonym of *Miegia gigantea* Nutt.
Nastus macrospermus Raspail, Ann. Sci. Nat., Bot. 5: 442, 458. pl. 8. f. 1. 1825. Based on *Arundinaria macrosperma* Michx.
Arundinaria macrosperma var. *arborescens* Munro, Linn. Soc. Trans. 26: 15. 1868. Based on *A. macrosperma* Michx.
Miegia arundinacea Torr.; Munro, Linn. Soc. Trans. 26: 15. 1868, as synonym of *Arundinaria macrosperma* var. *arborescens*.
Bambusa hermanni E. G. Camus, Bamb., Monogr. 36. 1913, horticultural name as synonym of *Arundinaria macrosperma* Michx.

(2) **Arundinaria tecta** (Walt.) Muhl., Descr. Gram. 191. 1817. Based on *Arundo tecta* Walt.
Arundo tecta Walt., Fl. Carol. 81. 1788. South Carolina.
Ludolfia tecta A. Dietr. Sp. Pl. 2: 24. 1833. Based on *Arundo tecta* Walt.
Miegia pumila Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 149. 1837. Junction of Red and Kiamichi Rivers, [Okla.]
Arundinaria tecta var. *pumila* Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^1: 112. 1839. Based on *Miegia pumila* Nutt.
?*Arundinaria tecta* var. *colorata* Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^1: 112. pl. 2. f. 1. δ 1839. North America.
?*Arundinaria tecta* var. *distachya* Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^1: 112. pl. 2. f. 1 γ. 1839. Philadelphia.
Arundinaria macrosperma var. *suffruticosa* Munro, Linn. Soc. Trans. 26: 15. 1868. Based on *A. tecta* Muhl.
Arundinaria macrosperma var. *tecta* Wood, Amer. Bot. and Flor. pt. 2: 404. 1870. Presumably based on *Arundo tecta* Walt. Published as new by Beal, Grasses N.Amer. 2: 659. 1896, same basis.
Arundinaria gigantea tecta Scribn., Bull. Torrey Bot. Club 20: 478. 1893. Based on *Arundo tecta* Walt.
Bambusa pumila Mitford, Garden 45: 530. 1894. "*Arundinaria.*" Cultivated at Kew from North America. Possibly based on *Miegia pumila* Nutt.

(24) ARUNDO L.

(1) **Arundo donax** L., Sp. Pl. 81. 1753. Southern Europe.
Arundo sativa Lam., Fl. Franç. 3: 616. 1778. France.
Arundo latifolia Salisb., Prodr. Stirp. 24. 1796. Based on *A. donax* L.
Donax arundinaceus Beauv., Ess. Agrost. 78, 152, 161. 1812. Based on *Arundo donax* L.
Scolochloa arundinacea Mert. and Koch; Roehl., Deut. Fl. ed. 3. 1^2: 530. 1823. Based on *Arundo donax* L.
Cynodon donax Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Arundo donax* L.
Scolochloa donax Gaudin, Fl. Helv. 1: 202. 1828. Based on *Arundo donax* L.
Donax donax Aschers. and Graebn., Fl. Nordostd. Flachl. 101. 1898. Based on *Arundo donax* L.
Arundo glauca Bubani, Fl. Pyr. 4: 303. 1901. Not *A. glauca* Bieb., 1808. Based on *Arundo donax* L.
ARUNDO DONAX var. VERSICOLOR Stokes, Bot. Mat. Med. 1: 160. 1812. Presumably based on *Arundo versicolor* Mill.
Arundo versicolor Mill., Gard. Dict. ed. 8. No. 3. 1768. Cultivated from India.
Arundo donax var. *variegata* Vilm., Fl. Pl. Terre 90. 1863. France.

(57) AVENA L.

(3) **Avena barbata** Brot., Fl. Lusit. 1: 108. 1804. Europe. [*Avena barbata* Pott; Link, Jour. Bot. Schrad. 2: 315. 1799, inadequately described from garden plants and said to be wild about Lisbon, may be the same species.]
Avena brevis Roth, Bot. Abh. 42. 1787. Europe.
Avena byzantina C. Koch, Linnaea 21: 392. 1848. Constantinople.
(1) **Avena fatua** L., Sp. Pl. 80. 1753. Europe.
Avena fatua var. *glabrata* Peterm., Fl. Bienitz 13. 1841. Europe.
(5) **Avena hookeri** Scribn., in Hack., True Grasses 123. 1890. Based on *A. versicolor* as described by Hooker.
Avena pratensis var. *americana* Scribn., Bot. Gaz. 11: 177. 1886. Based on *A. versicolor* as described by Hooker (Fl. Bor. Amer. 2: 244. 1840) not *A. versicolor* Vill. Rocky Mountains, *Drummond* [209].
Avena americana Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7: 183. f. 165. 1897. Based on *A. pratensis* var. *americana* Scribn.
(6)) **Avena mortoniana** Scribn., Bot. Gaz. 21: 133. pl. 11. 1896. Silver Plume, Colo., *Shear* 697 [type]; *Rydberg* 2439.
Avena nuda L., Amoen. Acad. 3: 401. 1756. Europe.
(4) **Avena pubescens** Huds., Fl. Angl. 42. 1762. England.
Heuffelia pubescens Schur, Enum. Pl. Transsilv. 760. 1866. Based on *Avena pubescens* L. (error for Huds.).
Avenula pubescens Dum., Bull. Soc. Bot. Belg. 7^1: 68. 1868. Based on *Avena pubescens* Huds.
Avenastrum pubescens Jess.; Dalla Torre, Alpenfl. 44. 1899. Based on *Avena pubescens* L. (error for Huds.).

(2) **Avena sativa** L., Sp. Pl. 79. 1753. Europe.
Avena sativa var. *nigra* Wood, Class-book ed. 2. 610. 1847. Not *A. sativa* var. *nigra* Schrank as to name but probably the same form. Cultivated.
Avena sativa var. *secunda* Wood, Class-book ed. 2. 610. 1847. *A. sativa* var. *secunda* Provancher, Fl. Canad. 2: 689. 1862, is probably the same form. Cultivated.
Avena fatua var. *sativa* Haesskn., Mitt. Geogr. Ges. Thüringen 3: 238. 1885. Presumably based on *Avena sativa* L.
Avena fatua subsp. *sativa* Thell., Vierteljahrs. Nat. Ges. Zürich 56: 325. 1911. Based on *A. sativa* L.
Avena sterilis L., Sp. Pl. ed. 2. 118. 1762. Spain.
Avena algeriensis Trab., Bull. Agr. Alger. Tunis. 16: 354. 1910. Cult.
Avena sterilis algeriensis Trab., Jour. Hered. 5: 77. 1914. Presumably based on *A. algeriensis* Trab.
Avena strigosa Schreb., Spic. Fl. Lips. 52. 1771. Europe.

(126) AXONOPUS Beauv.

(2) **Axonopus compressus** (Swartz) Beauv., Ess. Agrost. 12. 1812. Based on *Milium compressum* Swartz.
Milium compressum Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Jamaica.
Paspalum tristachyon Lam., Tabl. Encycl. 1: 176. 1791. South America, *Richard.*
Paspalum platicaulon Poir., in Lam., Encycl. Sup. 5: 34. 1804. Puerto Rico, *Ledru.*
Agrostis compressa Poir., in Lam., Encycl. Sup. 1: 259. 1810. Not *A. compressa* Poir, op. cit. 258, nor Willd., 1790. Based on *Milium compressum* Swartz.
Paspalum compressum Raspail, Ann. Sci. Nat., Bot. 5: 301. 1825. Based on *Axonopus compressus* Beauv.
Paspalum laticulmum Spreng., Syst. Veg. 1: 245. 1825. West Indies.
Digitaria platicaulis Desv., Opusc. 62. 1831. Based on *Paspalum platicaulon* Poir.
Digitaria domingensis Desv.; Kunth, Enum. Pl. 1: 49. 1833, as synonym of *Paspalum platicaulon* Poir.
Paspalum platycaule Willd.; Steud., Nom. Bot. ed. 2. 2: 272. 1840, erroneously cited as synonym of *P. furcatum* Flügge. Ecuador, *Humboldt.*
Paspalum guadaloupense Steud., Syn. Pl. Glum. 1: 18. 1854. Guadeloupe, *Duchaissing.*
Paspalum depressum Steud., Syn. Pl. Glum. 1: 20. 1854. Louisiana, *Hartmann* 51.
Paspalum filostachyum A. Rich.; Steud., Syn. Pl. Glum. 1: 20. 1854. West Indies, *Sieber* [365].
Anastrophus compressus Schlecht.; Doell, in Mart., Fl. Bras. 2^2: 102. 1877. Presumably based on *Milium compressum* Swartz.
Paspalum furcatum var. *parviflorum* Doell, in Mart., Fl. Bras. 2^2: 104. 1877. [West Indies] *Sieber* 365; [Louisiana], *Hartmann* 51.
Anastrophus platycaulis Schlecht.; Jacks., Ind. Kew. 1: 118. 1893, as synonym of *Paspalum platicaulon.*
Panicum platycaulon Kuntze, Rev. Gen. Pl. 3^2: 363. 1898. Based on *Paspalum platicaulon* Poir.
Paspalum raunkiaerii Mez, Repert. Sp. Nov. Fedde 15: 60. 1917. St. Jan, West Indies, *Raunkiaer* 1313.
(1) **Axonopus furcatus** (Flügge) Hitchc., Rhodora 8: 205. 1906. Based on *Paspalum furcatum* Flügge.
Paspalum furcatum Flügge, Monogr. Pasp. 114. 1810. Carolina, *Bosc.*
Paspalum digitaria C. Muell., Bot. Ztg. 19: 324. 1861. Not *P. digitaria* Poir., 1816. Texas, *Drummond* 276.
Paspalum michauxianum var. *villosum* Vasey, Bull. Torrey Bot. Club 13: 163. 1886. No locality cited. [Type, Orange County, Fla., *Curtiss* E.]
Paspalum furcatum var. *villosum* Vasey, Contrib. U.S. Natl. Herb. 3: 16. 1892. Presumably based on *Paspalum michauxianum* var. *villosum* Vasey.
Paspalum paspaloides var. *villosum* Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 42. 1901. Based on *P. furcatum* var. *villosum* Vasey.
Anastrophus furcatus Nash, N. Amer. Fl. 17: 162. 1912. Based on *Paspalum furcatum* Flügge.
This species was called *Paspalum paspaloides* by Scribner (Mem. Torrey Bot. Club 5: 29. 1894) and *Anastrophus paspaloides* by Nash (in Britton, Man. 75. 1901), but *Digitaria paspalodes* Michx., upon which these names are based, is *Paspalum distichum* L.

(98) BECKMANNIA Host

(1) **Beckmannia syzigachne** (Steud.) Fernald, Rhodora 30: 27. 1928. Based on *Panicum syzigachne* Steud.

Panicum syzigachne Steud., Flora 29: 19. 1846. Japan.

Beckmannia erucaeformis var. *uniflora* Scribn.; A. Gray, Man. ed. 6. 628. 1890. Iowa to Minnesota and westward.

Beckmannia erucaformis var. *baicalensis* Kuznezow, Bull. Angew. Bot. 6: 584. 1913. Siberia.

Beckmannia baicalensis Hultén, Svensk. Vet. Akad. Handl. III. 5: 119. 1927. Based on *B. erucaeformis* var. *baicalensis* Kuznezow.

In most American botanical works this is referred to *B. erucaeformis* (L.) Host, a European species. Nuttall (Gen. Pl. 1: 48. 1818) misspells the name *Bruchmannia*.

(35) BLEPHARIDACHNE Hack.

(2) **Blepharidachne bigelovii** (S. Wats.) Hack., in DC., Monogr. Phan. 6: 261. 1889. Based on *Eremochloe bigelovii* S. Wats.

Eremochloe bigelovii S. Wats., in King, Geol. Expl. 40th Par. 5: 382. pl. 40. f. 1–9. 1871. [Frontera, near El Paso, Tex.], *Wright* 2028.

Eremochloe thurberi S. Wats., in King, Geol. Expl. 40th Par. 5: pl. 40. f. 1–9. 1871. Name inadvertently given on the plate illustrating *E. bigelovii*.

(1) **Blepharidachne kingii** (S. Wats.) Hack., in DC., Monogr. Phan. 6: 261. 1889. Based on *Eremochloe kingii* S. Wats.

Eremochloe kingii S. Wats., in King, Geol. Expl. 40th Par. 5: 382. pl. 40. f. 10–16. 1871. Trinity Mountains, Nev., *Watson*.

(77) BLEPHARONEURON Nash

(1) **Blepharoneuron tricholepis** (Torr.) Nash, Bull. Torrey Bot. Club 25: 88. 1898. Based on *Vilfa tricholepis* Torr.

Vilfa tricholepis Torr., U.S. Rept. Expl. Miss. Pacif. 4: 155. 1857. Sandia Mountains, N.Mex. [*Bigelow*].

Sporobolus tricholepis Coulter, Man. Rocky Mount. 411. 1885. Based on *Vilfa tricholepis* Torr.

(104) BOUTELOUA Lag.[17]

(1) **Bouteloua aristidoides** (H.B.K.) Griseb., Fl. Brit. W. Ind. 537. 1864. Based on *Dinebra artistidoides* H.B.K.

Dinebra aristidoides H.B.K., Nov. Gen. and Sp. 1: 171. 1816. Mexico, *Humboldt* and *Bonpland*.

Atheropogon aristidoides Roem. and Schult., Syst. Veg. 2: 415. 1817. Based on *Dinebra aristidoides* H.B.K.

Eutriana aristidoides Trin., Gram. Unifl. 242. 1824. Based on *Atheropogon aristidoides* Roem. and Schult.

Dineba hirsuta Presl, Rel. Haenk. 1: 292. 1830. Peru, *Haenke*.

Eutriana hirsuta Kunth, Rév. Gram. 1: Sup. XXIII. 1830. Based on *Dineba hirsuta* Presl.

Aristida unilateralis Willd.; Steud., Nom. Bot. ed. 2. 1: 132. 1840, as synonym of *Eutriana aristidoides* Trin.

Bouteloua gracilis "Hook?"; Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 287. 1878. Not *B. gracilis* Lag., 1840. Arizona, *Rothrock* 701.

Bouteloua ciliata Griseb., Abh. Ges. Wiss. Göttingen 24: 302. 1879. Juramento, Argentina, *Lorenz* and *Hieronymus* 352.

Triathera aristidoides Nash, in Small, Fl. Southeast. U.S. 137. 1903. Based on *Dinebra aristidoides* H.B.K.

Bouteloua aristidoides var. *arizonica* Jones, Contrib. West. Bot. 14: 13. 1912. Tucson, Ariz., *Thornber* 177.

(10) **Bouteloua barbata** Lag., Var. Cienc. 2^4: 141. 1805. Mexico.

Actinochloa barbata Roem. and Schult., Syst. Veg. 2: 420. 1817. Based on *Bouteloua barbata* Lag.

Eutriana barbata Kunth, Rév. Gram. 1: 96. 1829. Based on *Bouteloua barbata* Lag.

Chondrosium polystachyum Benth., Bot. Voy. Sulph. 56. 1844. Magdalena Bay, Baja California, *Barclay*.

[17] Botelua Lag. Var. Cienc. 2^4: 134. 1805; Bouteloua Lag. Gen. and Sp. Nov. 5. 1816.

Chondrosium subscorpiodes C. Muell., Bot. Ztg. 14: 347. 1856. Baja California, *Barclay.*

Bouteloua polystachya Torr., U.S. Rept. Expl. Miss. Pacif. 5^2: 366. pl. 10. 1857. Based on *Chondrosium polystachyum* Benth.

Bouteloua pumila Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 93. 1863. Texas, *Wright* 754.

Bouteloua polystachya var. *major* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 287. 1878. Sonoyta Valley, Ariz., *Rothrock* 691.

Chondrosium exile Fourn., Mex. Pl. 2: 137. 1886. Mexico, *Berlandier* 842.

Chondrosium microstachyum Fourn., Mex. Pl. 2: 138. 1886. Guadalupe, Mexico, *Bourgeau* 667.

Bouteloua arenosa Vasey, in S. Wats., Amer. Acad. Sci. Proc. 24: 81. 1889, name only; U.S.Dept.Agr., Div. Bot. Bull. 12^1: pl. 34. 1890. Guaymas, Mexico, *Palmer* 189.

Bouteloua microstachya L.H. Dewey, Contrib. U.S. Natl. Herb. 2: 531. 1894. Based on *Chondrosium microstachyum* Fourn.

Bouteloua micrantha Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 8. 1901. Fort Lowell, Ariz., *Griffiths* 1556.

(15) **Bouteloua breviseta** Vasey, Contrib. U.S. Natl. Herb. 1: 58. 1890. (July 18.) Screw Bean, Presidio County, Tex., *Nealley* [669].

Bouteloua ramosa Scribn.; Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12^1: pl. 44. 1890. (Oct. 13.) Mexico to Arizona and western Texas, [type, *Nealley*].

Bouteloua oligostachya var. *ramosa* Scribn.; Beal, Grasses N.Amer. 2: 418. 1896. Based on *B. ramosa* Scribn.

(6) **Bouteloua chondrosioides** (H.B.K.) Benth.; S. Wats., Proc. Amer. Acad. 18: 179. 1883. Based on *Dinebra chondrosioides* H.B.K.

Dinebra chondrosioides H.B.K., Nov. Gen. and Sp. 1: 173. pl. 53. 1816. Michoacan, Mexico, *Humboldt* and *Bonpland.*

Bouteloua ovata Lag., Gen. and Sp. Nov. 5. 1816. Mexico.

Atheropogon chondrosioides Roem. and Schult., Syst. Veg. 2: 416. 1817. Based on *Dinebra chondrosioides* H.B.K.

Actinochloa ovata Roem. and Schult., Syst. Veg. 2: 420. 1817. Based on *Bouteloua ovata* Lag.

Eutriana cristata Trin., Gram. Unifl. 241. 1824. Based on *Atheropogon chondrosioides* Roem. and Schult.

Chondrosium humboldtianum Kunth, Rév. Gram. 1: 93. 1829. Based on *Dinebra chondrosioides* H.B.K.

Bouteloua havardii Vasey; S. Wats., Amer. Acad. Sci. Proc. 18: 179. 1883. Limpio Mountains, Tex., *Havard* in 1881.

(3) **Bouteloua curtipendula** (Michx.) Torr., in Emory, Notes Mil. Reconn. 154. 1848. Based on *Chloris curtipendula* Michx.

Chloris curtipendula Michx., Fl. Bor. Amer. 1: 59. 1803. Illinois, *Michaux.*

Bouteloua racemosa Lag., Var. Cienc. 2^4: 141. 1805. Mexico.

Bouteloua pendula Lag., Var. Cienc. 2^4: 141. 1805, as synonym of *B. racemosa.*

Atheropogon apludoides Muhl.; Willd., Sp. Pl. 4: 937. 1806. North America.

Bouteloua melicaeformis Brouss.; Hornem., Enum. Pl. Hort. Hafn. 7. 1807. Name only; Roem. and Schult., Syst. Veg. 2: 414. 1817, as synonym of *Atheropogon apludoides* Muhl.

Bouteloua melicoides Beauv., Ess. Agrost. 40, 155. pl. 9. f. 6. 1812. Based on *B. melicoides* Hornem., doubtless error for *melicaeformis.*

Dineba curtipendula Beauv., Ess. Agrost. 98, 158, 160. pl. 16. f. 1. 1812. Presumably based on *Chloris curtipendula* Michx.

Dineba melicoides Beauv., Ess. Agrost. 160. 1812, name only, probably same as *Bouteloua melicoides* Beauv.

Cynosurus secundus Pursh, Fl. Amer. Sept. 2: 728. 1814. "Upper Louisiana" [northern Middle Western States], *Bradbury.*

Atheropogon racemosus Roem. and Schult., Syst. Veg. 2: 414. 1817. Based on *Bouteloua racemosa* Lag.

Dineba secunda Roem. and Schult., Syst. Veg. 2: 711. 1817. Based on *Cynosurus secundus* Pursh.

Aristida secunda Rud.; Roem. and Schult., Syst. Veg. 2: 711. 1817, as synonym of *Dineba secunda* Roem. and Schult.

Eutriana curtipendula Trin., Fund. Agrost. 161. 1820. Based on *Chloris curtipendula* Michx.

Melica curtipendula Michx.; Steud., Nom. Bot. 1: 91, 519. 1821, as synonym of *Atheropogon apludoides* Muhl.

Cynodon curtipendula Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Dineba curtipendula* Beauv.

Cynodon melicoides Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Bouteloua melicoides* Beauv.

Andropogon curtipendulus Spreng.; Steud., Nom. Bot. ed. 2. 1: 90. 1840, as synonym of *Eutriana curtipendula* Trin.

Eutriana affinis Hook. f., Linn. Soc. Trans. 20: 174. 1851. St. Louis, Mo.; Texas, *Drummond.*

Heterostegon curtipendula Schwein., in Hook. f., Linn. Soc. Trans. 20: 175. 1851, as synonym of *Eutriana affinis.* North America, *Schweinitz;* Missouri and Texas, *Drummond.*

Bouteloua curtipendula var. *aristosa* A. Gray, Man. ed. 2. 553. 1856. Illinois, *Geyer.*

Atheropogon curtipendulus Fourn., Mex. Pl. 2: 138. 1886. Based on *Bouteloua curtipendula* A. Gray [error for Torrey].

Atheropogon medius Fourn., Mex. Pl. 2: 139. 1886. Mexico, *Liebmann* 581.

Atheropogon affinis Fourn., Mex. Pl. 2: 141. 1886. Based on *Eutriana affinis* Hook. f.

Bouteloua racemosa var. *aristosa* Wats. and Coult.; Gray, Man. ed. 6. 656. 1890. Illinois, *Geyer.*

(5) **Bouteloua eludens** Griffiths, Contrib. U.S. Natl. Herb. 14: 401. 1912. Santa Rita Mountains, Ariz., *Griffiths* 7269.

(16) **Bouteloua eriopoda** (Torr.) Torr., U.S. Rept. Expl. Miss. Pacif. 4: 155. 1856. Based on *Chondrosium eriopodum* Torr.

Chondrosium eriopodum Torr., in Emory, Notes Mill. Reconn. 154. 1848. Del Norte [Rio Grande] River, N.Mex., [*Bigelow*].

Bouteloua brevifolia Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 93. 1863. Northwestern Texas [*Wright* 748, *Fendler* 950].

(8) **Bouteloua filiformis** (Fourn.) Griffiths, Contrib. U.S. Natl. Herb. 14: 413. 1912. Based on *Atheropogon filiformis* Fourn.

Bouteloua juncifolia Vasey, Descr. Cat. Grasses U.S. 62. 1885. Name only, Texas [*Havard* 89] to Arizona. (*B. humboldtiana* Griseb., doubtfully cited, is *B. heterostega* (Trin.) Griffiths of the West Indies.)

Atheropogon filiformis Fourn., Mex. Pl. 2: 140. 1886. Mexico, *Karwinsky* 991b.

(14) **Bouteloua gracilis** (H.B.K.) Lag.; Steud., Nom. Bot. ed. 2. 1: 219. 1840. Based on *Chondrosium gracile* H.B.K.

Chondrosium gracile H.B.K., Nov. Gen. and Sp. 1: 176. pl. 58. 1816. Mexico, *Humboldt* and *Bonpland.*

Actinochloa gracilis Willd.; Roem. and Schult., Syst. Veg. 2: 418. 1817. Based on *Chondrosium gracile* H.B.K.

Atheropogon oligostachyus Nutt., Gen. Pl. 1: 78. 1818. Plains of the upper Missouri [*Nuttall*].

Eutriana gracilis Trin., Gram. Unifl. 240. 1824. Based on *Actinochloa gracilis* Willd.

Atheropogon gracilis Spreng., Syst. Veg. 1: 293. 1825. Based on *Chondrosium gracile* H.B.K.

Eutriana oligostachya Kunth, Rév. Gram. 1: 96. 1829. Based on *Atheropogon oligostachyus* Nutt.

Chondrosium gracile var. *polystachyum* Nees, Linnaea 19: 692. 1847. Mexico, *Aschenborn* 153. [Spikes 2 or 3.]

Chondrosium oligostachyum Torr., in Marcy, Expl. Red Riv. 300. 1852. Based on *Atheropogon oligostachyum* Nutt.

Bouteloua oligostachya Torr.; A. Gray, Man. ed. 2. 553. 1856. Based on *Atheropogon oligostachyus* Nutt.

Bouteloua oligostachya var. *intermedia* Vasey, Grasses U.S. 33. 1883. Name only. Texas to Arizona.

Bouteloua major Vasey, Bull. Torrey Bot. Club 14: 9. 1887. Name only, for a plant grown from seed collected in Mexico by Palmer.

Bouteloua oligostachya var. *major* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 531. 1894. Texas to Arizona [type, *Lemmon* 427].

Bouteloua oligostachya var. *pallida* Scribn.; Beal, Grasses N.Amer. 2: 418. 1896. Mexico, *Pringle* 407.

Bouteloua gracilis var. stricta (Vasey) Hitchc., Jour. Wash. Acad. Sci. 23: 454. 1933. Based on *B. stricta* Vasey.

Bouteloua stricta Vasey, Bull. Torrey Bot. Club 15: 49. 1888. Western Texas, *Nealley,* scarcely described; U.S.Dept.Agr., Div. Bot. Bull. 12[1]: pl. 45. 1890.

(13) **Bouteloua hirsuta** Lag., Var. Cienc. 2[4]: 141. 1805. Mexico.
Bouteloua hirta Lag., Var. Cienc. 2[4]: 141. 1805, as synonym of *B. hirsuta* Lag.
Chondrosium hirtum H.B.K., Nov. Gen. and Sp. 1: 176. pl. 59. 1816. Mexico, *Humboldt* and *Bonpland.*
Actinochloa hirsuta Roem. and Schult., Syst. Veg. 2: 419. 1817. Based on *Bouteloua hirsuta* Lag.
Eutriana hirta Trin., Gram. Unifl. 240. 1824. Based on *Actinochloa hirsuta* Roem. and Schult.
Atheropogon hirtus Spreng., Syst. Veg. 1: 293. 1825. Based on *Chondrosium hirtum* H.B.K.
Chondrosium hirsutum Sweet, Hort. Brit. 1: 455. 1826. Presumably based on *Actinochloa hirsuta* Roem. and Schult.
Atheropogon papillosus Engelm., Amer. Jour. Sci. 46: 104. 1843. Beardstown, Ill., *Geyer.*
Chondrosium aschenbornianum Nees, Linnaea 19: 692. 1847. Mexico, *Aschenborn* 331.
Chondrosium foeneum Torr., in Emory, Notes Mill. Reconn. 154. pl. 12. 1848. Valley of the Del Norte, [N.Mex., *Emory Exped.*].
Chondrosium papillosum Torr., in Marcy, Expl. Red. Riv. 300. 1852. Based on *Atheropogon papillosus* Engelm.
Bouteloua foenea Torr., Cat. Pl. Survey W. 100th Merid. 18. 1874. Based on *Chondrosium foeneum* Torr.
Bouteloua aschenborniana Griseb.; Fourn., Mex. Pl. 2: 137. 1886, as synonym of *Chondrosium aschenbornianum* Nees.
Chondrosium drummondii Fourn., Mex. Pl. 2: 137. 1886. Texas, *Drummond* 323.
Bouteloua palmeri Vasey, Bull. Torrey Bot. Club 14: 9. 1887. Name only, later described as *B. hirsuta* var. *palmeri* Vasey; Beal.
Bouteloua hirsuta var. *minor* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12[1]: pl. 39. f. 2. 1890, nomen seminudum. [Texas, *Reverchon* 1153.]
Bouteloua hirsuta var. *major* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12[1]: pl. 39. f. 3. 1890. Without description. [Austin, Tex., *Stiles* in 1884.]
Bouteloua hirta Scribn., Contrib. U.S. Natl. Herb. 2: 531. 1894. Based on *Chondrosium hirtum* H.B.K.
Bouteloua hirta var. *major* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 531. 1894. Western Texas to Mexico.
Bouteloua hirta var. *minor* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 531. 1894. Central Texas.
Bouteloua hirsuta var. *palmeri* Vasey; Beal, Grasses N.Amer. 2: 417. 1896. Cultivated, seed collected by Palmer in Mexico.
Bouteloua bolanderi Vasey; Beal, Grasses N.Amer. 2: 417. 1896, as synonym of *B. hirsuta* var. *palmeri* Vasey.
Bouteloua pectinata Featherly, Bot. Gaz. 91: 103. f. 1–4. 1931. Oklahoma, *English* 71.

(11) **Bouteloua parryi** (Fourn.) Griffiths, Contrib. U.S. Natl. Herb. 14: 381. 1912. Based on *Chondrosium parryi* Fourn.
Bouteloua polystachya var. *vestita* S. Wats., Amer. Acad. Sci. Proc. 18: 177. 1883. Sierra Madre south of Saltillo, Mexico, *Palmer* 1357 in 1880.
Chondrosium parryi Fourn., Mex. Pl. 2: 150. 1886. San Luis Potosí, *Parry* and *Palmer* 923½ [error for 943½].
Bouteloua vestita Scribn.; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 531. 1894. Based on *B. polystachya* var. *vestita* S. Wats.

(7) **Bouteloua radicosa** (Fourn.) Griffiths, Contrib. U.S. Natl. Herb. 14: 411. 1912. Based on *Atheropogon radicosus* Fourn.
Dinebra bromoides H.B.K., Nov. Gen. and Sp. 1: 172. pl. 51. 1816. Not *Bouteloua bromoides* Lag., 1816. Mexico, *Humboldt* and *Bonpland.*
Atheropogon bromoides Roem. and Schult., Syst. Veg. 2: 415. 1817. Based on *Dinebra bromoides* H.B.K.
Eutriana bromoides Trin., Fund. Agrost. 161. 1820. Based on *Dinebra bromoides* H.B.K.
Nestlera festucaeformis Willd.; Steud., Nom. Bot. ed. 2. 2: 192. 1841, as synonym of *Eutriana bromoides* Trin.
Atheropogon radicosus Fourn., Mex. Pl. 2: 140. 1886. Mexico City, *Bourgeau* 450.
Bouteloua bromoides var. *radicosa* Vasey, L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 533. 1894. Based on *Atheropogon radicosus* Fourn.

(4) **Bouteloua rigidiseta** (Steud.) Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. Based on *Aegopogon rigidisetus* Steud.

Aegopogon rigidisetus Steud., Syn. Pl. Glum. 1: 146. 1854. Texas, *Drummond.*

Bouteloua texana S. Wats., Amer. Acad. Sci. Proc. 18: 196. 1883. Texas, *Berlandier* 1535, *Drummond* 340, 374.

Polyodon texanus Nash, in Small, Fl. Southeast. U.S. 138, 1327. 1903. Based on *Bouteloua texana* S. Wats.

(12) **Bouteloua rothrockii** Vasey, Contrib. U.S. Natl. Herb. 1: 268. 1893. Cottonwood, Ariz., *Rothrock* 347.

(9) **Bouteloua simplex** Lag., Var. Cienc. 2[1]: 141. 1805. Peru.

Chloris procumbens Durand, Chlor. Sp. 16. 1808. Grown at Madrid, seed said to come from the Philippine Islands (collected by Née) where the species is not known to occur. Probably from South America or Mexico, which regions Née visited.

Chloris filiformis Poir., in Lam., Encycl. Sup. 2: 237. 1811. Grown at Paris, the source unknown.

Chondrosium procumbens Desv.; Beauv., Ess. Agrost. 41, 158. pl. 9. f. 7. 1812. Based on *Chloris procumbens* Durand.

Chondrosium humile Beauv., Ess. Agrost. 41, 158. 1812. Name only.

Chondrosium tenue Beauv., Ess. Agrost. 41, 158. 1812. Name only.

Atheropogon procumbens Jacq., Eclog. Gram. 2: 16. pl. 12. 1813. Based on *Chloris procumbens* Durand.

Bouteloua prostrata Lag., Gen. and Sp., Nov. 5. 1816. Mexico.

Chondrosium humile H.B.K., Nov. Gen. and Sp. 1: 175. pl. 56. 1816. Ecuador, *Humboldt* and *Bonpland.*

Chondrosium tenue Beauv.; H.B.K., Nov. Gen. and Sp. 1: 176. pl. 57. 1816. Mexico, *Humboldt* and *Bonpland.*

Chloris tenuis Poir., in Lam., Encycl. Sup. 5: 614. 1817. Based on *C. filiformis* Poir., p. 237, not *C. filiformis* Poir., op. cit. p. 238.

Actinochloa procumbens Roem. and Schult., Syst. Veg. 2: 417. 1817. Based on *Chloris procumbens* Durand.

Actinochloa humilis Willd.; Roem. and Schult., Syst. Veg. 2: 417. 1817. Based on *Chondrosium humile* H.B.K.

Actinochloa simplex Roem. and Schult., Syst. Veg. 2: 418. 1817. Based on *Bouteloua simplex* Lag.

Actinochloa tenuis Willd.; Roem. and Schult., Syst. Veg. 2: 418. 1817. Based on *Chondrosium tenue* H.B.K.

Actinochloa prostrata Roem. and Schult., Syst. Veg. 2: 419. 1817. Based on *Bouteloua prostrata* Lag.

Eutriana humilis Trin., Gram. Unifl. 239. 1824. Based on *Actinochloa humilis* Willd.

Eutriana tenuis Trin., Gram. Unifl. 240. 1824. Based on *Actinochloa tenuis* Willd.

Atheropogon humilis Spreng., Syst. Veg. 1: 293. 1825. Based on *Chondrosium humile* H.B.K.

Cynodon procumbens Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Chondrosium procumbens* Desv.

Chondrosium prostratum Sweet, Hort. Brit. 1: 455. 1826. Based on *Bouteloua prostrata* Lag.

Chondrosium simplex Kunth, Rév. Gram. 1: 94. 1829. Based on *Bouteloua simplex* Lag.

Bouteloua tenuis Griseb., Abh. Ges. Wiss. Göttingen 19: 211. 1874. Based on *Chondrosium tenue* Beauv.

Bouteloua humilis Hieron., Bol. Acad. Cienc. Córdoba 4: 495. 1882. Based on *Chondrosium humile* Beauv.

Bouteloua pusilla Vasey, Bull. Torrey Bot. Club 11: 6. 1884. Kingman, N. Mex., *Vasey.*

Bouteloua brachyathera Phil., An. Mus. Nac. Chile Bot. 8: 85. 1891. Tarapacá, Chile.

Bouteloua rahmeri Phil., An. Mus. Nac. Chile Bot. 8: 85. 1891. Tarapacá, Chile.

Bouteloua procumbens Griffiths, Contrib. U.S. Natl. Herb. 14: 364. 1912. Based on *Chloris procumbens* Durand.

Bouteloua simplex var. *rahmeri* Henr., Med. Rijks Herb. Leiden no. 40: 66. 1921. Based on *B. rahmeri* Phil.

(17) **Bouteloua trifida** Thurb., in S. Wats., Amer. Acad. Sci. Proc. 18: 177. 1883. Monclova, Coahuila, *Palmer* 1355 in 1880.
Bouteloua burkii Scribn., in S. Wats., Amer. Acad. Sci. Proc. 18: 179. 1883. Western Texas and New Mexico, *Berlandier* 167 and 1427.
Chondrosium trinii Fourn., Mex. Pl. 2: 136. 1886. Laredo, Tex., *Berlandier* 1427.
Chondrosium polystachyum Trin.; Fourn., Mex. Pl. 2: 136. 1886, as synonym of *C. trinii* Fourn.
Chondrosium virletii Fourn., Mex. Pl. 2: 136. 1886. San Luis Potosí, Mexico, *Virlet* 1373.
Bouteloua trifida var. *burkii* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 532. 1894. Based on *B. burkii* Scribn.
Bouteloua trinii Griffiths, Contrib. U.S. Natl. Herb. 14: 387. 1912. Based on *Chondrosium trinii* Fourn. Griffiths accepts 1881 as the date for Fournier's work.
(2) **Bouteloua uniflora** Vasey, Bot. Gaz. 16: 26. 1891. Crockett County, Tex., *Nealley* [222].

(125) BRACHIARIA (Trin.) Griseb.

(1) **Brachiaria ciliatissima** (Buckl.) Chase, in Hitchc., U.S. Dept. Agr. Bull. 772: 221. 1920. Based on *Panicum ciliatissimum* Buckl.
Panicum ciliatissimum Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 4. 1866. Northern Texas [*Buckley*].
Brachiaria erucaeformis (J. E. Smith) Griseb., in Ledeb., Fl. Ross. 4: 469. 1853. Based on *Panicum erucaeforme* J. E. Smith.
Panicum erucaeforme J. E. Smith, in Sibth., Fl. Graec. 1: 44. pl. 59. 1806. Greece.
Panicum isachne Roth, in Roem. and Schult., Syst. Veg. 2: 458. 1819. East Indies.
Echinochloa eruciformis Koch, Linnaea 21: 437. 1848. Based on *Panicum erucaeforme* J. E. Smith.
Panicum isachne var. *mexicana* Beal, Grasses N.Amer. 2: 114. 1896. Grown from seed said to come from Mexico.
Brachiaria isachne Stapf, in Prain, Fl. Trop. Afr. 9: 552. 1919. Based on *Panicum isachne* Roth.
(2) **Brachiaria extensa** Chase, Contrib. U.S. Natl. Herb. 28: 240. 1929. Based on *Paspalum platyphyllum* Griseb.
Paspalum platyphyllum Griseb., Cat. Pl. Cub. 230. 1866. Not *P. platyphyllum* Schult., 1827. Zarabanda, Cuba, *Wright* 3441.
Panicum platyphyllum Munro; Wright, An. Acad. Cienc. Habana 8: 206. 1871. Based on *Paspalum platyphyllum* Griseb.
Brachiaria platyphylla Nash, in Small, Fl. Southeast. U.S. 81, 1327. 1903. Based on *Panicum platyphyllum* Munro.
(3) **Brachiaria plantaginea** (Link) Hitchc., Contrib. U.S. Natl. Herb. 12: 212. 1909. Based on *Panicum plantagineum* Link.
Panicum plantagineum Link, Hort. Berol. 1: 206. 1827. Grown in Berlin, origin unknown.
Panicum leandri Trin., Gram. Icon. 3: pl. 335. 1836. Brazil.
Panicum distans Salzm.; Steud., Syn. Pl. Glum. 1: 61. 1854. Not *P. distans* Trin., 1829. Bahia, Brazil [*Salzmann*].
Panicum disciferum Fourn., Mex. Pl. 2: 19. 1886. San Luis Potosí, Mexico, *Virlet* 1292.

(80) BRACHYELYTRUM Beauv.

(1) **Brachyelytrum erectum** (Schreb.) Beauv., Ess. Agrost. 155. 1812. Based on *Muhlenbergia erecta* Schreb.
?*Dilepyrum aristosum* Michx., Fl. Bor. Amer. 1: 40. 1803. Georgia and Carolina, *Michaux*.
?*Muhlenbergia aristata* Pers., Syn. Pl. 1: 73. 1805. Based on *Dilepyrum aristosum* Michx.
Muhlenbergia erecta Schreb., in Spreng., Mém. Acad. St. Pétersb. 2: 287. 1807–08. Georgia and Carolina.
?*Brachyelytrum aristatum* Roem. and Schult., Syst. Veg. 2: 413. 1817. Based on *Dilepyrum aristosum* Michx.
Muhlenbergia brachyelytrum Trin., Gram. Unifl. 188. 1824. Based on *Brachyelytrum erectum* Beauv.

Agrostis erecta Spreng., Syst. Veg. 1: 264. 1825. Based on *Muhlenbergia erecta* Schreb.

Brachyelytrum aristatum var. *engelmanni* A. Gray, Man. ed. 5. 614. 1867. "A western form."

?*Brachyelytrum aristosum* Trel., Brann. and Coville, in Branner, Rept. Ark. Geol. Survey 4: 235. 1891. Based on *Dilepyrum aristosum* Michx.

Brachyelytrum aristosum var. *glabratum* Vasey, in Millsp. W.Va. Agr. Expt. Sta. Bull. 24: 469. 1892. Fayette near Nuttallburg, W.Va., *Nuttall.*

Dilepyrum erectum Farwell, Amer. Midl. Nat. 8: 33. 1922. Based on *Muhlenbergia erecta* Schreb.

Brachypodium distachyon (L.) Beauv., Ess. Agrost. 101, 155. 1812. Based on *Bromus distachyos* L.

Bromus distachyos L., Cent. Pl. 2: 8. 1756; Amoen. Acad. 4: 304. 1759. Europe and the Orient.

Brachypodium sylvaticum (Huds.) Beauv., Ess. Agrost. 101, 155. 1810. Based ultimately on *Festuca sylvatica* Huds.

Festuca sylvatica Huds., Fl. Angl. 1: 38. 1762. England.

(11) BRIZA L.

(1) **Briza maxima** L., Sp. Pl. 70. 1753. Europe.

(3) **Briza media** L., Sp. Pl. 70. 1753. Europe.

(2) **Briza minor** L., Sp. Pl. 70. 1753. Europe.

(2) BROMUS L.

(3) **Bromus aleutensis** Trin.; Griseb., in Ledeb., Fl. Ross. 4: 361. 1853. Unalaska, *Eschscholz.*

(19) **Bromus anomalus** Rupr.; Fourn., Bull. Acad. Sci. Brux. 9²: 236. 1840. Name only; Mex. Pl. 2: 126. 1886. Mexico, *Galeotti* 5757, 5815.

Bromus kalmii var. *porteri* Coult., Man. Rocky Mount. 425. 1885. Twin Lakes, Colo., *Porter.*

Bromus ciliatus var. *minor* Munro; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 548. 1894. West Texas [Chisos Mountains, *Havard* 20].

Bromus ciliatus porteri Rydb., Contrib. U.S. Natl. Herb. 3: 192. 1895. Based on *B. kalmii* var. *porteri* Coult.

Bromus porteri Nash, Bull. Torrey Bot. Club 22: 512. 1895. Based on *B. kalmii* var. *porteri* Coult.

Bromus ciliatus var. *montanus* Vasey; Beal, Grasses N.Amer. 2: 619. 1896. Colorado, *Patterson* 264.

Bromus kalmii var. *occidentalis* Vasey; Beal, Grasses N.Amer. 2: 624. 1896. Montana [type, *Canby* and *Scribner* 384].

Bromus scabratus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 13: 46. 1898. Not *B. scabratus* Link, 1843. Vermilion Creek, Wyo., *A. Nelson* 3800.

Bromus kalmii var. *major* Vasey; Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 35. 1900, as synonym of *B. porteri* Nash.

Bromus porteri havardii Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 37. 1900. Based on *B. ciliatus* var. *minor* Munro.

Bromus anomalus var. lanatipes (Shear) Hitchc., Jour. Wash. Acad. Sci. 23: 449. 1933. Based on *B. porteri lanatipes* Shear.

Bromus porteri lanatipes Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 37. 1900. Idaho Springs, Colo., *Shear* 739.

Bromus lanatipes Rydb., Colo. Agr. Expt. Sta. Bull. 100: 52. 1906. Based on *B. porteri lanatipes* Shear.

(30) **Bromus arenarius** Labill., Nov. Holl. Pl. 1: 23. pl. 28. 1804. Australia.

(29) **Bromus arvensis** L., Sp. Pl. 77. 1753. Europe.

Bromus erectus var. *arvensis* Huds., Fl. Angl. ed. 2. 50. 1778. Based on *B. arvensis* L.

Serrafalcus arvensis Godr., Fl. Lorr. 3: 185. 1844. Based on *Bromus arvensis* L.

Forasaccus arvensis Bubani, Fl. Pyr. 4: 385. 1901. Based on *Bromus arvensis* L.

(4) **Bromus breviaristatus** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1863. Rocky Mountains, *Nuttall.*

Bromus parviflorus Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863, as synonym of *B. breviaristatus* Buckl.

Bromus subvelutinus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 52. 1900. Reno, Nev., *Tracy* 249.

Bromus pauciflorus Nutt.; Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 53. 1900. This name, on Nuttall's ticket on the type of *B. breviaristatus* Buckl., was misread as "*parviflorus*" by Gray.

Bromus carinatus lincaris Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 61. 1900. California, *Vasey* in 1875.

(22) **Bromus brizaeformis** Fisch. and Mey., Ind. Sem. Hort. Petrop. 3: 30. 1837. Europe.

(5) **Bromus carinatus** Hook. and Arn., Bot., Beechey Voy. 403. 1840. California.

Ceratochloa grandiflora Hook., Fl. Bor. Amer. 2: 253. 1840. Not *Bromus grandiflorus* Weigel, 1772. Plains of the Columbia [Oregon], *Scouler, Douglas.*

Bromus oregonus Nutt.; Hook. f., Jour. Bot. Kew Misc. 8: 18. 1856. Name only for *Geyer* 244, "Upper Missouri and Oregon territories". Nutt.; Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 59. 1900, as synonym of *B. carinatus.*

Bromus virens Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1863. Rocky Mountains and Columbia River, *Nuttall.* The specimen in the herbarium of the Philadelphia Academy is the Pacific coast form with long awns, and probably came from the Columbia River.

Bromus californicus Nutt.; Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863, as synonym of *B. virens* Buckl. [California, *Nuttall.*]

Bromus nitens Nutt; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863, as synonym of *B. virens* Buckl. [Columbia woods, *Nuttall.*]

Bromus hookerianus Thurb., in Wilkes, U.S. Expl. Exped. Bot. 17: 493. 1874. Based on *Ceratochloa grandiflora* Hook.

Bromus hookerianus var. *minor* Scribn.; Vasey, Descr. Cat. Grasses U.S. 92. 1885, name only, Oregon. Macoun, Cat. Can. Pl. 2[4]: 238. 1888, without description, *B. virens* Buckl., cited as synonym.

Bromus virens var. *minor* Scribn.; Beal, Grasses N.Amer. 2: 614. 1896. Arizona and Oregon.

Bromus carinatus californicus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 60. 1900. [California, *Nuttall.*]

Bromus carinatus hookerianus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 60. 1900. Based on *B. hookerianus* Thurb.

Bromus carinatus densus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 61. 1900. San Nicolas Island, Calif., *Trask* [12].

Bromus carinatus arizonicus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 62. 1900. Santa Cruz Valley, Tucson, Ariz., *Pringle* in 1884.

Bromus marginatus Nees; Steud., Syn. Pl. Glum. 1: 322. 1854. Columbia River, *Douglas.*

Bromus hookeri var. *marginatus* Fourn., Mex. Pl. 2: 127. 1886. Based on *B. marginatus* Nees. [*B. hookeri* Fourn. (not *B. hookerianus* Thurb.) is based on "*B. purgans* Hook. f., Bot. of Capt. Beech. Voy. 119", name only.]

Ceratochloa marginata Nees; Steud.; Jacks., Ind. Kew. 1: 487. 1893, presumably referring to *Bromus marginatus* Nees.

Bromus marginatus seminudus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 55. 1900. Wallowa Lake, Oreg., *Shear* 1811.

Bromus marginatus latior Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 55. 1900. Walla Walla, Wash., *Shear* 1615.

Bromus flodmanii Rydb., Bull. Torrey Bot. Club 36: 538. 1909. Sheep Creek, Mont., *Flodman* 187.

Forasaccus marginatus Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus marginatus* Nees.

Bromus latior Rydb., Fl. Rocky Mount. 89. 1917. Based on *B. marginatus latior* Shear.

Bromus maritimus (Piper) Hitchc., in Jepson, Fl. Calif. 1: 177. 1912. Based on *B. marginatus maritimus* Piper.

Bromus marginatus maritimus Piper, Biol. Soc. Wash. Proc. 18: 148. 1905. Point Reyes, Calif., *Davy* 6798.

BROMUS POLYANTHUS Scribn.; Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 56. 1900. Based on *B. multiflorus* Scribn.

Bromus multiflorus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 13: 46. 1898. Not *B. multiflorus* Weigel, 1772. Battle Lake, Wyo., *A. Nelson* 4021.

Bromus polyanthus paniculatus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 57. 1900. West Mancos Canyon, Colo., *Tracy, Earle,* and *Baker* 333.

Bromus paniculatus Rydb., Fl. Rocky Mount. 90. 1917. Based on *B. polyanthus paniculatus* Shear.

(1) **Bromus catharticus** Vahl, Symb. Bot. 2: 22. 1791. Lima, Peru.

Festuca unioloides Willd., Hort. Berol. 3. pl. 3. 1803. Described from a plant grown at Berlin from seed from "Carolina", where it must have been cultivated.

Ceratochloa unioloides Beauv., Ess. Agrost. 75. pl. 15. f. 7. 1812. Based on *Festuca unioloides* Willd.

Bromus unioloides H.B.K., Nov. Gen. and Sp., 1: 151. 1815. Quito, Ecuador, *Humboldt* and *Bonpland.*

Schedonorus unioloides Roem. and Schult., Syst. Veg. 2: 708. 1817. Based on *Bromus unioloides* H.B.K.

Bromus unioloides Raspail, Ann. Sci. Nat., Bot. 5: 439. 1825. Based on *Ceratochloa unioloides* Beauv.

Bromus willdenovii Kunth, Rév. Gram. 1: 134. 1829. Based on *Festuca unioloides* Willd.

Ceratochloa pendula Schrad., Linnaea 6: Litt. 72. 1831. Grown at Göttingen from seed from Carolina.

Bromus schraderi Kunth, Enum. Pl. 1: 416. 1833. Based on *Ceratochloa pendula* Schrad.

Bromus mucronatus Willd; Steud., Nom. Bot. ed. 2. 1: 228. 1840, as synonym of *B. unioloides* H.B.K.

Ceratochloa breviaristata Hook., Fl. Bor. Amer. 2: 253. pl. 234. 1840. Lewis and Clarke River and near the sources of the Columbia. *Douglas* [in 1826].

Bromus breviaristatus Thurb., in Wilkes, U.S. Expl. Exped. Bot. 17[2]: 493. 1874. Not *B. breviaristatus* Buckl., 1863. Based on *Ceratochloa breviaristata* Hook.

Tragus unioloides Panz.; Jacks., Ind. Kew. 4: 1099. 1895, as synonym of *Festuca unioloides* Willd.

Forasaccus brebiaristatus [error for *breviaristatus*] Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Ceratochloa breviaristata* Hook.

Zerna unioloides Lindm., Svensk Fanerogamfl. 101. 1918. Based on *Bromus unioloides* H.B.K.

The form described by Shear (U.S.Dept.Agr., Div. Agrost. Bull. 23: 52. 1900) as *Bromus unioloides haenkeanus* (Presl) Shear is a form of rescue grass, but *Ceratochloa haenkeana* Presl, upon which the name is based, is a different species with purplish, awned spikelets, as shown by examination of the type, from Chile, at the herbarium of the German University at Prague.

(15) **Bromus ciliatus** L., Sp. Pl. 1: 76. 1753. Grown at Upsala from seed collected by Kalm in Canada.

Bromus canadensis Michx., Fl. Bor. Amer. 1: 65. 1803. Canada, Lac St. Jean, *Michaux.*

Bromus richardsoni Link, Hort. Berol. 2: 281. 1833. Grown at Berlin from seed sent by Richardson from northwestern North America.

Bromus purgans var. *longispicatus* Hook., Fl. Bor. Amer. 2: 252. 1840. Rocky Mountains, *Drummond.*

Bromus purgans var. *pallidus* Hook., Fl. Bor. Amer. 2: 252. 1840. Saskatchewan to Rocky Mountains, *Drummond.*

Bromus inermis var. *ciliatus* Traut., Act. Hort. Petrop. 5: 135. 1877. Based on *B. ciliatus* L.

Bromus hookeri var. *canadensis* Fourn., Mex. Pl. 2: 128. 1886. Based on *B. canadensis* Michx.

Bromus hookeri var. *ciliatus* Fourn., Mex. Pl. 2: 128. 1886. Based on *B. ciliatus* L.

Bromus ciliatus scariosus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 13: 46. 1898. Sheep Mountain, Wyo., *A. Nelson* 3305.

Bromus richardsoni pallidus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 34. 1900. Based on *B. purgans* var. *pallidus* Hook.

Forasaccus ciliatus Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus ciliatus* L.

Bromus ciliatus forma *denudatus* Wiegand, Rhodora 24: 91. 1922. Ashfield, Mass., *Williams* in 1909.

Bromus ciliatus var. *denudatus* Fernald, Rhodora 28: 20. 1926. Based on *B. ciliatus* forma *denudatus* Wiegand.

Bromus dudleyi Fernald, Rhodora 32: 63. pl. 196. f. 1–3. 1930. Deer Brook, Bonne Bay, Newfoundland, *Fernald, Long* and *Fogg* 1223.

Bromus ciliatus var. *intonsus* Fernald, Rhodora 32: 70. 1930. Ashfield, Mass., *Williams*, August 4, 1909. The form with more densely pilose sheaths. According to Fernald (Rhodora 32: 70. 1930) this, as shown by specimens so named in the Gray Herbarium, is the form described as *B. asper* Murray in Gray's Manual, eds. 5 and 6, and in Britton and Brown's Illustrated Flora. Shear in his revision of *Bromus* (U.S.Dept.Agr., Div. Agrost. Bull. 23: 30. 1900) uses the earlier name *B. ramosus* Huds., but says he had seen no American specimens.

BROMUS CILIATUS var. LAEVIGLUMIS Scribn.; Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 32. 1900. Galt, Ontario, *Herriott* in 1898. (Published as *B. ciliatus laeviglumis.*)

Forasaccus ciliatus var. *laeviglumis* Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus ciliatus laeviglumis* Scribn.

Bromus purgans forma *glabriflorus* Wiegand, Rhodora 24: 92. 1922. Ithaca, N.Y., *Metcalf* 5813.

Bromus laeviglumis Hitchc., Biol. Soc. Wash. Proc. 41: 157. 1928. Based on *B. ciliatus laeviglumis* Scribn.

(24) **Bromus commutatus** Schrad., Fl. Germ. 353. 1806. Germany.

Bromus pratensis Ehrh., Beitr. 6: 84. 1791. Name only; Hoffm. Deut. Fl. ed. 2. 2: 52. 1800. Not *B. pratensis* Lam., 1785. Europe.

Brachypodium commutatum Beauv., Ess. Agrost. 101, 155. 1812. Based on *Bromus commutatus* Lam. (error for Schrad.).

Serrafalcus commutatus Bab., Man. Brit. Bot. ed. 1. 374. 1843. Based on *Bromus commutatus* Schrad.

Bromus mutabilis var. *commutatus* Schultz, Flora 32: 234. 1849. Based on *B. commutatus* Schrad.

Bromus racemosus var. *commutatus* Coss. and Dur., Expl. Sci. Alger. 2: 165. 1867. Based on *B. commutatus* Schrad.

Bromus mollis var. *commutatus* Sanio, Verh. Bot. Ver. Brand. 23: Abh. 31. 1882. Based on *B. commutatus* Schrad.

Serrafalcus racemosus var. *commutatus* Husnot, Gram. Fr. Belg. 72. 1899. Based on *Bromus commutatus* Schrad.

Forasaccus commutatus Bubani, Fl. Pyr. 4: 387. 1901. Based on *Bromus commutatus* Schrad.

Bromus secalinus var. *gladewitzii* Farwell, Amer. Midl. Nat. 10: 24. 1926. Michigan, *Farwell* and *Gladewitz* 7434.

BROMUS COMMUTATUS var. APRICORUM Simonkai, Enum., Fl. Transsilv. 583. 1886. Europe.

(8) **Bromus erectus** Huds., Fl. Angl. 39. 1762. England.

Festuca erecta Wallr., Sched. Crit. 35. 1822. Based on *Bromus erectus* Smith (error for Huds.).

Bromus macounii Vasey, Bull. Torrey Bot. Club 15: 48. 1888. Vancouver Island, *Macoun* in 1887.

Forasaccus erectus Bubani, Fl. Pyr. 4: 384. 1901. Based on *Bromus erectus* Huds.

(21) **Bromus frondosus** (Shear) Woot. and Standl., N.Mex. Coll. Agr. Bull. 81: 144. 1912. Based on *B. porteri frondosus* Shear.

Bromus porteri frondosus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 37. 1900. Mangas, N.Mex., *J. G. Smith* in 1897.

(11) **Bromus grandis** (Shear) Hitchc., in Jepson, Fl. Calif. 1: 175. 1912. Based on *B. orcuttianus grandis* Shear.

Bromus orcuttianus grandis Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 43. 1900. San Diego, Calif., *Orcutt* 472.

Bromus porteri assimilis Davy, Univ. Calif. Pubs., Bot. 1: 55. 1902. San Jacinto Mountains, *Hall* 2228.

(6) **Bromus inermis** Leyss., Fl. Hal. 16. 1761. Europe.

Festuca inermis DC. and Lam., Fl. Franc. 3: 49. 1805. Based on *Bromus inermis* Leyss.

Schedonorus inermis Beauv., Ess. Agrost. 99, 177. 1812. Based on *Festuca inermis* DC.

Festuca inermis var. *villosa* Mert. and Koch, Deutschl. Fl. 1: 675. 1823. Germany.

Bromus inermis var. *aristatus* Schur, Enum. Pl. Transsilv. 805. 1866. Europe.
Bromus inopinatus Brues, Trans. Wis. Acad. Sci., Arts, and Letters 17: 73. 1911. Milwaukee, Wis. [*Brues* 78].
Forasaccus inermis Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus inermis* Leyss.
Zerna inermis Lindm., Svensk Fanerogamfl. 101. 1918. Based on *Bromus inermis* Leyss.
Bromus inermis forma *villosus* Fernald, Rhodora 35: 316. 1933. Based on *Festuca inermis* var. *villosa* Mert. and Koch.
Bromus inermis forma *aristatus* Fernald, Rhodora 35: 316. 1933. Based on *B. inermis* var. *aristatus* Schur.

(28) **Bromus japonicus** Thunb., Fl. Japon. 52. 1784. Japan.
Bromus patulus Mert. and Koch, Deut. Fl. 1: 685. 1823. Europe.
Bromus arvensis var. *patulus* Mutel, Fl. Franç. 4: 134. 1837. Based on *B. patulus* Mert. and Koch.
Serrafalcus patulus Parl., Fl. Ital. 1: 394. 1848. Based on *Bromus patulus* Mert. and Koch.
Bromus squarrosus var. *patulus* Regel, Act. Hort. Petrop. 7: 602. 1881. Based on *B. patulus* Mert. and Koch.
Forasaccus patulus Bubani, Fl. Pyr. 4: 387. 1901. Based on *Bromus patulus* Mert. and Koch.

(20) **Bromus kalmii** A. Gray, Man. 600. 1848. Canada or northeastern United States, *Kalm.*

Bromus laciniatus Beal Grasses N.Amer. 2: 615. 1896. Mexico.
Bromus pendulinus Sessé; Lag., Gen. and Sp. Nov. 4. 1816. Not *B. pendulinus* Schrad. 1810. Mexico.

(13) **Bromus laevipes** Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 45. 1900. West Klickitat County, Wash., *Suksdorf* 178.

(17) **Bromus latiglumis** Hitchc., Rhodora 8: 211. 1906. Based on *B. purgans latiglumis* Shear.
Bromus altissimus Pursh, Fl. Amer. Sept. 2: 728. 1814. Not *B. altissimus* Gilib., 1790. On the banks of the Missouri [*Nuttall*].
Bromus purgans latiglumis Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 40. 1900. Dakota City, Iowa, *Pammel* 222.
Bromus ciliatus latiglumis Scribn.; Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 40. 1900, as synonym of *B. purgans latiglumis* Shear.
Bromus purgans incanus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 41. 1900. Canton, Ill., *Wolf* 3.
Bromus incanus Hitchc., Rhodora 8: 212. 1906. Based on *B. purgans incanus* Shear.
Forasaccus latiglumis Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus latiglumis* Hitchc.
Bromus ciliatus var. *incanus* Farwell, Amer. Midl. Nat. 10: 204. 1927. Based on *B. purgans incanus* Shear.
Bromus ciliatus var. *incanus* subvar. *latiglumis* Farwell, Amer. Midl. Nat. 10: 204. 1927. Based on *B. ciliatus latiglumis* Scribn.
Bromus latiglumis forma *incanus* Fernald, Rhodora 35: 316. 1933. Based on *B. purgans incanus* Shear.

Bromus macrostachys Desf., Fl. Atlant. 1: 96. pl. 19. f. 2. 1798. Algeria.

(34) **Bromus madritensis** L., Cent. Pl. 1: 5. 1755; Amoen. Acad. 4: 265. 1759. Spain. (The name is spelled *matritensis* in Roem. and Schult., Syst. Veg. 2: 651. 1817.)
Festuca madritensis Desf., Fl. Atlant. 1: 91. 1798. Based on *Bromus madritensis* L.
Zerna madritensis Panz.; Jacks., Ind. Kew. 4: 1249. 1895, as synonym of *Bromus madritensis* L.

(26) **Bromus molliformis** Lloyd, Fl. Loire-Inf. 315. 1844. France.

(25) **Bromus mollis** L., Sp. Pl. ed. 2. 1: 112. 1762. Europe.
Forasaccus mollis Bubani, Fl. Pyr. 4: 386. 1901. Based on *Bromus mollis* L.
This is the species referred to *B. hordeaceus* L. in recent American works. The specimen referred by Shear (U.S.Dept.Agr., Div. Agrost. Bull. 23: 19. 1900) to *B. hordeaceus intermedius* (Guss.) Shear belongs to *B. mollis*.

(10) **Bromus orcuttianus** Vasey, Bot. Gaz. 10: 223. 1885. San Diego, Calif., *Orcutt* in 1884.
Bromus brachyphyllus Merr., Rhodora 4: 146. 1902. Crook County, Oreg., *Cusick* 2677.

BROMUS ORCUTTIANUS var. HALLII Hitchc., in Jepson, Fl. Calif. 1: 175. 1912. San Jacinto Mountains, *Hall* 2301.

(12) **Bromus pacificus** Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 38. 1900. Seaside, Oreg., *Scribner* and *Shear* 1703.

Bromus magnificus Elmer, Bot. Gaz. 36: 53. 1903. Port Angeles, Wash., *Elmer* 1957.

(7) **Bromus pumpellianus** Scribn., Bull. Torrey Bot. Club 15: 9. 1888. Belt Mountains, Mont., *Scribner* 418.

Bromus purgans var. *purpurascens* Hook., Fl. Bor. Amer. 2: 252. 1840. Bear Lake to Arctic seacoast, *Richardson.*

Bromus ciliatus var. *coloradensis* Vasey, Bull. Torrey Bot. Club 15: 10. 1888, name only; Beal, Grasses N.Amer. 2: 619. 1896. [Colo. Expl. 100th Merid. *Wolf* 1158.]

Bromus pumpellianus melicoides Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 50. 1900. Beaver Creek Camp, Colo., *Pammel* in 1896.

Forasaccus pumpellianus Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus pumpellianus* Scribn.

BROMUS PUMPELLIANUS var. TWEEDYI Scribn.; Beal, Grasses N.Amer. 2: 622. 1896. Yellowstone Park, *Tweedy* 587.

(16) **Bromus purgans** L., Sp. Pl. 1: 76. 1753. Canada, *Kalm.*

Bromus pubescens Muhl.; Willd., Enum. Pl. 120. 1809. Pennsylvania, *Muhlenberg.*

Bromus imperialis Steud., Nom. Bot. ed. 2. 1: 229. 1840, as synonym of *B. purgans* L.

Bromus steudelii Frank; Steud., Nom. Bot. ed. 2. 1: 229. 1840, as synonym of *B. purgans* L.

Bromus ciliatus var. *purgans* A. Gray, Man. 600. 1848. Based on *B. purgans* L.

Bromus hookeri var. *pubescens* Fourn., Mex. Pl. 2: 127. 1886. Based on *B. pubescens* Muhl.

Forasaccus purgans Lunell, Amer. Midl. Nat. 4: 225. 1915. Based on *Bromus purgans* L.

Bromus purgans forma *laevivaginatus* Wiegand, Rhodora 24: 92. 1922. Ithaca, N.Y., *Metcalf* 5821.

Bromus ciliatus var. *purgans* subvar. *laevivaginatus* Farwell, Amer. Midl. Nat. 10: 204. 1927. Presumably based on *B. purgans* forma *laevivaginatus* Wiegand.

(27) **Bromus racemosus** L., Sp. Pl. ed. 2. 1: 114. 1762. Europe.

Bromus arvensis var. *racemosus* Neilreich, Fl. Nieder-Oesterr. 81. 1859. Based on *B. racemosus* L.

Bromus squarrosus var. *racemosus* Regel, Act. Hort. Petrop. 7: 602. 1881. Based on *B. racemosus* L.

Forasaccus racemosus Bubani, Fl. Pyr. 4: 387. 1901. Based on *Bromus racemosus* L.

The specimens referred by Shear (U.S.Dept.Agr., Div. Agrost. Bull. 23: 20. 1900) to *B. hordeaceus glabrescens* (Coss.) Shear belong to *B. racemosus.*

(31) **Bromus rigidus** Roth, Mag. Bot. Roem. and Ust. 10: 21. 1790. Europe.

Bromus villosus Forsk., Fl. Aegypt. Arab. 23. 1775. Not *B. villosus* Scop., 1772. Egypt.

Bromus maximus Desf., Fl. Atlant. 1: 95. pl. 26. 1798. Not *B. maximus* Gilib., 1790. North Africa.

Bromus madritensis var. *maximus* St. Amans, Fl. Agen. 45. 1821. Based on *B. maximus* Desf.

Bromus rubens var. *rigidus* Mutel, Fl. Franç. 4: 133. 1837. Based on *B. rigidus* Roth.

Bromus madritensis var. *rigidus* Bab.; Syme in Sowerby, English Bot. ed. 3. 11: 161. 1873. Based on *B. rigidus* Roth.

Bromus villosus var. *maximus* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 595. 1901. Based on *B. maximus* Desf.

Bromus villosus var. *rigidus* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 596. 1901. Based on *B. rigidus* Roth.

Forasaccus maximus Bubani, Fl. Pyr. 4: 382. 1901. Based on *Bromus maximus* Desf.

BROMUS RIGIDUS var. GUSSONII (Parl.) Coss. and Dur., Expl. Sci. Alger. 2: 159. 1867. Based on *B. gussonii* Parl.

Bromus gussonii Parl., Rar. Pl. Sic. 2: 8. 1840. Europe.

Bromus maximus var. *gussonii* Parl., Fl. Ital. 1: 407. 1848. Based on *B. gussonii* Parl.

Bromus villosus var. *gussonii* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 595. 1901. Based on *B. gussonii* Parl.

(33) **Bromus rubens** L., Cent. Pl. 1: 5. 1755; Amoen. Acad. 4: 265. 1759. Spain.

Festuca rubens Pers., Syn. Pl. 1: 94. 1805. Based on *Bromus rubens* L.

Bromus scoparius var. *rubens* St. Amans, Fl. Agen. 45. 1821. Based on *B. rubens* L.

Bromus madritensis subsp. *rubens* Husnot, Gram. Fr. Belg. 71. 1899. Based on *B. rubens* L.

Bromus scoparius L., Cent. Pl. 1: 6. 1755; Amoen. Acad. 4: 266. 1759. Spain.

(23) **Bromus secalinus** L., Sp. Pl. 76. 1753. Europe.

Bromus mollis var. *secalinus* Huds., Fl. Angl. ed. 2. 49. 1778. Based on *B. secalinus* L.

Avena secalinus Salisb., Prodr. Stirp. 22. 1796. Based on *Bromus secalinus* L.

Serrafalcus secalinus Bab., Man. Brit. Bot. ed. 1. 374. 1843. Based on *Bromus secalinus* L.

?*Bromus submuticus* Steud., Syn. Pl. Glum. 1: 321. 1854. St. Louis, Mo.

Forasaccus secalinus Bubani, Fl. Pyr. 4: 388. 1901. Based on *Bromus secalinus* L.

Bromus secalinus var. velutinus Koch, Syn. Fl. Germ. Helv. 819. 1837. Based on *B. velutinus* Schrad.

Bromus velutinus Schrad., Fl. Germ. 1: 349. pl. 6. f. 3. 1806. Germany.

(2) **Bromus sitchensis** Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 173. 1832. Sitka, Alaska [*Mertens*].

(32) **Bromus sterilis** L., Sp. Pl. 77. 1753. Europe.

Schedonorus sterilis Fries, Bot. Not. 131. 1843. Based on *Bromus sterilis* L.

Zerna sterilis Panz.; Jacks., Ind. Kew. 4: 1249. 1895, as synonym of *Bromus sterilis* L.

(9) **Bromus suksdorfii** Vasey, Bot. Gaz. 10: 223. 1885. Mount Adams, Wash., *Suksdorf* [74 in 1883].

(35) **Bromus tectorum** L., Sp. Pl. 77. 1753. Europe.

Schedonorus tectorum Fries, Bot. Not. 131. 1843. Based on *Bromus tectorum* L.

Bromus setaceus Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1863. Northern Texas, *Buckley*.

Zerna tectorum Panz.; Jacks., Ind. Kew. 4: 1249. 1895, as synonym of *Bromus tectorum* L.

Bromus tectorum var. glabratus Spenner, Fl. Friburg. 1: 152. 1825. Germany.

Bromus tectorum var. *nudus* Klett. and Richt., Fl. Leipzig 109. 1830. Germany.

(18) **Bromus texensis** (Shear) Hitchc., Contrib. U.S. Natl. Herb. 17: 381. 1913. Based on *B. purgans texensis* Shear.

Bromus purgans texensis Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 41. 1900. Bexar County, Tex., *Jermy* 230.

(36) **Bromus trinii** Desv., in Gay, Fl. Chil. 6: 441. 1853. Based on *Trisetum hirtum* Trin.

Trisetum hirtum Trin., Linnaea 10: 300. 1836. Not *Bromus hirtus* Lichtst., 1817. Chile.

Bromus trinii var. *pallidiflorus* Desv., in Gay, Fl. Chil. 6: 441. 1853. Chile.

Trisetum barbatum Steud., Syn. Pl. Glum. 1: 229. 1854. Not *T. barbatum* Nees, 1841. Chile, *Bertero* 806.

Danthonia pseudo-spicata C. Muell., Bot. Ztg. 14: 348. 1856. Valparaiso, Chile, *Cuming* 466.

Bromus barbatoides Beal, Grasses N.Amer. 2: 614. 1896. Based on *Trisetum barbatum* Steud.

Bromus barbatoides var. *sulcatus* Beal, Grasses N.Amer. 2: 615. 1896. Mexico, *Palmer* 667.

Trisetum barbatum var. *major* Vasey; Beal, Grasses N.Amer. 2: 615. 1896, as synonym of *Bromus barbatoides* var. *sulcatus* Beal.

Trisetum trinii Louis-Marie, Rhodora 30: 243. 1928. Based on *Bromus trinii* Desv.

Trisetum trinii var. *pallidiflorus* Louis-Marie, Rhodora 30: 243. 1928. Based on *Bromus trinii* var. *pallidiflorus* Desv.

Trisetum trinii var. *majus* Louis-Marie, Rhodora 30: 243. 1928. Based on *T. barbatum* var. *major* Vasey.

Bromus trinii var. excelsus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 25. 1900. Panamint Mountains, Calif., *Coville* and *Funston* 522.

(14) **Bromus vulgaris** (Hook.) Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 43. 1900. Based on *B. purgans* var. *vulgaris* Hook.

Bromus purgans var. *vulgaris* Hook., Fl. Bor. Amer. 2: 252. 1840. Canada, *Goldie, Richardson*; Red River, *Douglas;* Columbia River, *Scouler.*

Bromus ciliatus var. *ligulatus* Vasey; Macoun, Cat. Can. Pl. 2[4]: 238. 1888. Name only, Vancouver Island, *Macoun* in 1887.

Bromus ciliatus var. *pauciflorus* Vasey; Macoun, Cat. Can. Pl. 2[4]: 238. 1888, name only. Beal, Grasses N.Amer. 2: 619. 1896. Oregon, *Howell.*

Bromus debilis Nutt.; Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 43. 1900, as synonym of *B. vulgaris.* [Columbia River, *Scouler.*]

Bromus vulgaris eximius Shear, U.S.Dept.Agr., Div. Agrost. Bull 23: 44. 1900. Near Wallowa Lake, Oreg., *Shear* 1791.

Bromus vulgaris robustus Shear, U.S.Dept.Agr., Div. Agrost. Bull. 23: 44. 1900. Seaside, Oreg., *Shear* 1710.

Bromus ciliatus var. *glaberrimus* Suksdorf, Deut. Bot. Monatsschr. 19: 93. 1901. Skamania County, Wash., *Suksdorf* in 1894 [2335].

Bromus eximius Piper, Contrib. U.S. Natl. Herb. 11: 143. 1906. Based on *B. vulgaris eximius* Shear.

Bromus eximius robustus Piper, Contrib. U.S. Natl. Herb. 11: 143. 1906. Based on *B. vulgaris robustus* Shear.

Bromus eximius umbraticus Piper, Contrib. U.S. Natl. Herb. 11: 144. 1906. Based on *Bromus vulgaris* Shear, not *Bromus purgans* var. *vulgaris* Hook., Piper considering the specimens referred by Shear to this species to be distinct from the form described by Hooker.

(107) BUCHLOË Engelm.

(1) **Buchloë dactyloides** (Nutt.) Engelm., St. Louis Acad. Sci. Trans. 1: 432. 1859. Based on *Sesleria dactyloides* Nutt.

Sesleria dactyloides Nutt., Gen. Pl. 1: 65. 1818. Grassy plains of the Missouri [*Nuttall,* type a staminate plant].

Anthephora axilliflora Steud., Syn. Pl. Glum. 1: 111. 1854. [Misspelled *Antephora.*] Texas, *Drummond* [pistillate plant].

Calanthera dactyloides Kunth; Hook., Jour. Bot. Kew Misc. 8: 18. 1856. Based on *Sesleria dactyloides* Nutt.

Lasiostega humilis Rupr.; Munro, in Benth., Pl. Hartw. 347. 1857. Name only (error for *Casiostega*). Aguas Calientes, Mexico, *Hartweg* 250.

Casiostega dactyloides Fourn., Bull. Soc. Bot. Belg. 15: 470. 1876. Based on *Sesleria dactyloides* Nutt.

Casiostega hookeri Rupr.; Fourn., Bull. Soc. Bot. Belg. 15: 471. 1876, as synonym of *Buchloë dactyloides* Engelm.

Bouteloua mutica Griseb.; Fourn., Bull. Soc. Bot. Belg. 15: 471. 1876, as synonym of *Buchloë dactyloides* Engelm., Mexico, *Schaffner* 134 [staminate plant].

Melica mexicana Link; Fourn., Bull. Soc. Bot. Belg. 15: 471. 1876, as synonym of *Buchloë dactyloides* Engelm.

Bulbilis dactyloides Raf.; Kuntze, Rev. Gen. Pl. 2: 763. 1891. Based on *Sesleria dactyloides* Nutt.

(61) CALAMAGROSTIS Adans.

(1) **Calamagrostis bolanderi** Thurb., in S. Wats., Bot. Calif. 2: 280. 1880. Mendocino County, Calif., *Bolander* 6471 in part.

Calamagrostis varia Boland.; Thurb., in S. Wats., Bot. Calif. 2: 280. 1880. Not *C. varia* Host, 1809. As synonym of *C. bolanderi* Thurb.

Deyeuxia bolanderi Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis bolanderi* Thurb.

(3) **Calamagrostis breweri** Thurb., in S. Wats., Bot. Calif. 2: 280. 1880. Carson Pass, Calif., *Brewer* 2128.

Deyeuxia breweri Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis breweri* Thurb.

Calamagrostis lemmoni Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 16. 1898. California, *Lemmon* in 1875.

Calamagrostis Cainii Hitchc., Jour. Wash. Acad. Sci. 24: 480. 1934. Mount LeConte, Tenn., *Cain* 48. (See p. 993.)

Calamagrostis californica Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 37. 1898. Sierra Nevada, Calif., *Lemmon* 444 in 1895. Anomalous form.

(16) **Calamagrostis canadensis** (Michx.) Beauv., Ess. Agrost. 15, 152, 157. 1812. Based on *Arundo canadensis* Michx.

Arundo canadensis Michx., Fl. Bor. Amer. 1: 73. 1803. Canada, *Michaux.*

Arundo agrostoides Pursh, Fl. Amer. Sept. 1: 86. 1814. New Jersey and Pennsylvania.

Calamagrostis mexicana Nutt., Gen. Pl. 1: 46. 1818. North America. "*Agrostis mexicana*? Persoon, *Arundo agrostoides* Pursh" are cited. *Agrostis mexicana* L., in Persoon's work is *Muhlenbergia mexicana*, but Nuttall's description agrees with Pursh's.

Calamagrostis agrostoides Pursh; Spreng., Syst. Veg. 1: 252. 1825. Presumably based on *Arundo agrostoides* Pursh.

Cinna purshii Kunth, Rév. Gram. 1: 67. 1829. Based on *Arundo agrostoides* Pursh.

Arundo fissa Willd.; Steud., Nom. Bot. ed. 2. 1: 144. 1840, as synonym of *Calamagrostis michauxii* Trin.

Calamagrostis michauxii Trin.; Steud., Nom. Bot. ed. 2. 1: 250. 1840. Based on *Arundo canadensis* Michx.

Deyeuxia canadensis Munro; Hook. f., Linn. Soc. Trans. 23: 345. 1861. Presumably based on *Arundo canadensis* Michx., indirect citations given. See also, Vasey, Grasses U.S. 28. 1883; Agr. Grasses U.S. 69. pl. 59. 1884; Cassidy, Colo. Agr. Expt. Sta. Bull. 12: 48, with plate. 1890.

Calamagrostis oregonensis Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1863. Columbia River, *Nuttall.*

Calamagrostis columbiensis Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863. Name only [Columbia River, *Nuttall*].

Calamagrostis canadensis var. *robusta* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 285. 1878. Twin Lakes, Colo., Expl. 100th Merid. [*Wolf*] 1093.

Calamagrostis pallida Vasey and Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 79. 1892. Not *C. pallida* C. Muell., 1861. Washington, *Suksdorf* in 1883.

Calamagrostis blanda Beal, Grasses N.Amer. 2: 349. 1896. Based on *C. pallida* Vasey and Scribn.

Calamagrostis canadensis acuminata Vasey; Shear and Rydb., U.S.Dept.Agr., Div. Agrost. Bull. 5: 26. 1897. Georgetown, Colo., *Shear* 615 [type]; Montana, Idaho.

Calamagrostis canadensis campestris Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 31. 1898. Louis Plain, Assiniboia, *Macoun* 56.

Calamagrostis alaskana Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 32. 1898. Yukon River, Alaska, *Funston* 157.

Calamagrostis atropurpurea Nash, Bull. N.Y. Bot. Gard. 2: 153. 1901. Dawson, Yukon Territory, *R. S. Williams* in 1899.

Calamagrostis anomala Suksdorf, Allg. Bot. Ztschr. 12: 43. 1906. Mount Paddo [Adams], Wash., *Suksdorf* 2824.

Calamagrostis langsdorfi var. *acuminata* Litw., Trav. Mus. Bot. Acad. Sci. Petrograd 18: 52. 1920. Based on *C. canadensis* var. *acuminata* Vasey.

Calamagrostis canadensis var. *pallida* Stebbins, Rhodora 32: 45. 1930. Based on *C. pallida* Vasey and Scribn.

Calamagrostis scribneri var. *imberbis* Stebbins, Rhodora 32: 46. 1930. Based on *C. anomala* Suksdorf "not Steud., in Lechl., Berb. Am. Aust. 56. (1857)," a name only.

Calamagrostis canadensis var. macouniana Stebbins, Rhodora 32: 41. 1930. Based on *Deyeuxia macouniana* Vasey.

Deyeuxia macouniana Vasey, Bot. Gaz. 10: 297. 1885. Northwest Territory, *Macoun.*

Calamagrostis macouniana Vasey, Contrib. U.S. Natl. Herb. 3: 81. 1892. Based on *Deyeuxia macouniana* Vasey.

Calamagrostis canadensis var. scabra (Presl) Hitchc., Amer. Jour. Bot. 21: 135. 1934. Based on *C. scabra* Presl.

Calamagrostis scabra Presl, Rel. Haenk. 1: 234. 1830. Nootka Sound, Vancouver Island, *Haenke.*

Deyeuxia preslii Kunth, Rév. Gram. 1: Sup. XX. 1830. Based on *Calamagrostis scabra* Presl.

This variety has been referred to *Calamagrostis langsdorfi* (Link) Trin. by many American authors. A fragment of the type of *Arundo langsdorfi* Link, sent by Dr. Pilger from the Berlin Herbarium, shows that it is not an American species. The rachilla is very minute or wanting, the spikelets are smaller than in *C. scabra*, the glumes are thinner, showing the nerves distinctly, and the blades are

narrower. The following names, typonyms of *C. langsdorfi*, found in American works, belong to the Old World species:

Arundo langsdorfi Link, Enum. Pl. 1: 74. 1821. Described from a garden specimen.

Calamagrostis langsdorfi Trin., Gram. Unifl. 225. pl. 4. f. 10. 1824. Based on *Arundo langsdorfi* Link.

Deyeuxia langsdorfi Kunth, Rév. Gram. 1: 77. 1829. Based on *Arundo langsdorfi* Link.

Calamagrostis canadensis var. *langsdorfi* Inman, Rhodora 24: 143. 1922. Based on *Arundo langsdorfi* Link.

(18) **Calamagrostis cinnoides** (Muhl.) Barton, Compend. Fl. Phila. 1: 45. 1818. Based on *Arundo cinnoides* Muhl.

Agrostis glauca Muhl., Descr. Gram. 76. 1817. Not *Calamagrostis glauca* Reichenb., 1830. Pennsylvania, New Jersey, Carolina.

Arundo cinnoides Muhl., Descr. Gram. 187. 1817. Pennsylvania, Massachusetts.

Arundo coarctata Torr., Fl. North. and Mid. U.S. 1: 94. 1823. New Jersey.

Calamagrostis langsdorfi var. *marylandica* Trin., Gram. Unifl. 225. 1824. Based on *Arundo cinnoides* Muhl.

Arundo canadensis Nutt.; Steud., Nom. Bot. ed. 2. 1: 144. 1840, as synonym of *Calamagrostis nuttalliana* Steud. [Philadelphia, *Nuttall.*]

Calamagrostis nuttalliana Steud., Nom. Bot. ed. 2. 1: 251. 1840. Based on the species described by Nuttall [from specimen from Philadelphia] as *C. canadensis* (Nutt. Gen. Pl. 1: 46. 1818).

Calamagrostis coarctata Torr.; Hook., Fl. Bor. Amer. 2: 240. 1840. Presumably based on *Arundo coarctata* Torr. Published as new in Torr., Fl. N.Y. 2: 444. pl. 151. 1843. Based on *A. coarctata* Torr.

Deyeuxia nuttalliana Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis nuttalliana* Steud.

(22) **Calamagrostis crassiglumis** Thurb., in S. Wats., Bot. Calif. 2: 281. 1880. Mendocino County, Calif., *Bolander* 4766, 4787.

Deyeuxia crassiglumis Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis crassiglumis* Thurb.

Calamagrostis neglecta var. *crassiglumis* Beal, Grasses N.Amer. 2: 353. 1896. Based on *C. crassiglumis* Thurb.

(12) **Calamagrostis densa** Vasey, Bot. Gaz. 16: 147. 1891. Julian, San Diego County, Calif., *Orcutt.*

Calamagrostis koelerioides var. *densa* Beal, Grasses N.Amer. 2: 345. 1896. Based on *C. densa* Vasey.

Calamagrostis vilfaeformis Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 20. 1898. Based on *C. densa* Vasey.

(23) **Calamagrostis epigeios** (L.) Roth, Tent. Fl. Germ. 1: 34. 1788. Based on *Arundo epigeios* L.

Arundo epigeios L., Sp. Pl. 81. 1753. Europe.

Calamagrostis georgica C. Koch, Linnaea 21: 387. 1848. Georgia (Russia) near Tiflis.

Calamagrostis epigejos var. *georgica* Ledeb., Fl. Ross. 4: 433. 1853. Based on *C. georgica* C. Koch. (Fide Fernald, Rhodora 35: 65. 1933.)

Calamagrostis arenicola Fernald, Rhodora 30: 203. 1928. Barnstable County, Mass., *Fernald* 757.

(5) **Calamagrostis foliosa** Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 17. 1898. Based on *C. sylvatica* var. *longifolia* Vasey.

Calamagrostis sylvatica var. *longifolia* Vasey, Contrib. U.S. Natl. Herb. 3: 83. 1892. Not *C. longifolia* Hook., 1840. [Humboldt County] Calif., *Bolander* 6470.

(2) **Calamagrostis howellii** Vasey, Bot. Gaz. 6: 271. 1881. Oregon, *Howell.*

Deyeuxia howellii Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis howellii* Vasey.

(20) **Calamagrostis inexpansa** A. Gray, Gram. and Cyp. 1: no. 20. 1834. Penn Yan, N.Y., *Sartwell.*

Calamagrostis hirtigluma Steud., Syn. Pl. Glum. 1: 188. 1854. Labrador.

Calamagrostis stricta var. *brevior* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 285. 1878. Mosquito, Colo., [*Wolf*] 1098.

Calamagrostis stricta var. *robusta* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 285. 1878. Twin Lakes, Colo., [*Wolf*] 1099.

Deyeuxia neglecta var. *americana* Vasey; Macoun, Cat. Can. Pl. 2^4: 206. 1888. Donald, Columbia Valley, *Macoun* in 1885.

Deyeuxia neglecta var. *robusta* Vasey; Macoun, Cat. Can. Pl. 2[4]: 206. 1888. Alberta, *Macoun*.

Deyeuxia glomerata Vasey; Macoun, Bot. Gaz. 16: 288. 1891. Name only. Rocky Mountains, British Columbia, *J.* and *J. M. Macoun* in 1890.

Calamagrostis robusta Vasey, Contrib. U.S. Natl. Herb. 3: 82. 1892. Not *C. robusta* Muell., 1861. Presumably based on *C. stricta* var. *robusta* Vasey, the description being an amplification of that.

Calamagrostis americana Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 5: 27. 1897. Based on *Deyeuxia neglecta* var. *americana* Vasey.

Calamagrostis inexpansa cuprea Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 37. 1898. Falcon Valley, Wash., *Suksdorf* 910.

Calamagrostis hyperborea stenodes Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 39. 1898. Marshall Pass, Colo., *Clements* 206.

Calamagrostis hyperborea elongata Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 40. 1898. Plummer County, Nebr., *Rydberg* 1494.

Calamagrostis hyperborea americana Kearney, U.S.Dept.Agr., Div. Agrost. Bull 11: 41. 1898. Based on *Deyeuxia neglecta* var. *americana* Vasey.

Calamagrostis micrantha var. *sierrae* Jones, Contrib. West. Bot. 14: 9. 1912. Prattville and Susanville, Calif. [*Jones.*]

Calamagrostis neglecta var. *inexpansa* Jones, Contrib. West. Bot. 14: 9. 1912. Based on *C. inexpansa* A. Gray.

Deyeuxia hyperborea elongata Lunell, Amer. Midl. Nat. 4: 218. 1915. Based on *Calamagrostis hyperborea elongata* Kearney.

Deyeuxia hyperborea stenodes Lunell, Amer. Midl. Nat. 4: 218. 1915. Based on *Calamagrostis hyperborea stenodes* Kearney.

Calamagrostis elongata Rydb., Fl. Rocky Mount. 58. 1917. Based on *C. hyperborea elongata* Kearney.

Calamagrostis wyomingensis Gandog., Bull. Soc. Bot. France 66[7]: 299. 1920. Granger, Wyo., *Nelson* 3884.

Calamagrostis scopulorum var. *bakeri* Stebbins, Rhodora 32: 47. 1930. Pagosa Peak, Colo., *Baker* 162.

Calamagrostis inexpansa var. *robusta* Stebbins, Rhodora 32: 48. 1930. Based on *C. stricta* var. *robusta* Vasey.

Calamagrostis inexpansa var. *brevior* Stebbins, Rhodora 32: 50. 1930. Based on *C. stricta* var. *brevior* Vasey.

This species has been referred by American authors to *C. hyperborea* Lange (*C. neglecta* var. *hyperborea* Jones, *Deyeuxia hyperborea* Lunell); and to *C. stricta* Trin.

CALAMAGROSTIS INEXPANSA var. BARBULATA Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 37. 1898. Mason County, Wash., *Piper* 947.

CALAMAGROSTIS INEXPANSA var. NOVAE-ANGLIAE Stebbins, Rhodora 32: 51. 1930. Mount Desert, Maine, *Williams* and *Rand* in 1899.

(13) **Calamagrostis koelerioides** Vasey, Bot. Gaz. 16: 147. 1891. Julian, San Diego County, Calif., *Orcutt*.

(17) **Calamagrostis lactea** Beal, Grasses N.Amer. 2: 346. 1896. Washington, *Suksdorf* 1022.

Deyeuxia lactea Beal, Grasses N.Amer. 2: 346. 1896, as synonym of *Calamagrostis lactea*. Suksdorf, Deut. Bot. Monatsschr. 19: 92. 1901. Based on *C. lactea* Beal.

Calamagrostis langsdorfi lactea Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 28. 1898. Based on *C. lactea* Beal.

(7) **Calamagrostis montanensis** Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 82. 1892. Montana, *Scribner*.

Deyeuxia montanensis Scribn., Soc. Prom. Agr. Sci. Proc. 2: 52. 1885. Helena, Mont., *Scribner*.

Calamagrostis neglecta var. *candidula* Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 35. 1898. Cypress Hills, Assiniboia, *Macoun* 7483.

(21) **Calamagrostis neglecta** (Ehrh.) Gaertn., Mey. and Scherb., Fl. Wett. 1: 94. 1799. Based on *Arundo neglecta* Ehrh.

Arundo neglecta Ehrh., Beitr. 6: 137. 1791. Europe.

Deyeuxia neglecta Kunth, Rév. Gram. 1: 76. 1829. Based on *Arundo neglecta* Ehrh.

Deyeuxia neglecta var. *gracilis* Scribn., Bot. Gaz. 11: 175. 1886. Yellowstone Park, *Tweedy* 582.

Deyeuxia vancouverensis Vasey, Bull. Torrey Bot. Club 15: 48. 1888. Locality erroneously given as "Vancouver Island", *Macoun* in 1887. Correction made in Macoun, Cat. Can. Pl. 2[4]: 207. 1888. Fort George, James Bay, Quebec.

Deyeuxia neglecta var. *brevifolia* Vasey; Macoun, Cat. Can. Pl. 2[4]: 206. 1888. Pelly Banks, Northwest Territory, *Dawson.*

Deyeuxia borealis Macoun, Cat. Can. Pl. 2[4]: 207. 1888. Change of name for *D. vancouverensis* Vasey, erroneously ascribed to Vancouver Island; collected at Fort George, James Bay, Quebec, *J. M. Macoun.*

Calamagrostis laxiflora Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 34. 1898. Not *C. laxiflora* Phil., 1896. Based on "*C. neglecta gracilis* Scribn.", error for *Deyeuxia neglecta gracilis* Scribn.

Calamagrostis neglecta gracilis Scribn.; Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 34. 1898, as synonym of *C. laxiflora* Kearney.

Calamagrostis micrantha Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 36. 1898. Prince Albert, Saskatchewan, *Macoun* 13111.

Calamagrostis neglecta var. *micrantha* Stebbins, Rhodora 32: 55. 1930. Based on *C. micrantha* Kearney.

(11) **Calamagrostis nutkaensis** (Presl) Steud., Syn. Pl. Glum. 1: 190. 1854. Based on *Deyeuxia nutkaensis* Presl.

Deyeuxia nutkaensis Presl, Rel. Haenk. 1: 250. 1830. Nootka Sound, Vancouver Island, *Haenke.*

Calamagrostis aleutica Trin., in Bong., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 171. 1832. Unalaska Island, Alaska.

Deyeuxia aleutica Munro; Hook. f., Linn. Soc. Trans. 23: 345. 1862. Based on *Calamagrostis aleutica* Trin.

Calamagrostis albicans Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1863. Columbia Plains, Oreg., *Nuttall.*

Calamagrostis pallida Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863, as synonym of *C. albicans* Buckl. ["Columbia alluvions," *Nuttall.*]

Calamagrostis albescens Buckl.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863, herbarium name, as synonym of *C. albicans* Buckl.

Deyeuxia breviaristata Vasey, Bull. Torrey Bot. Club 15: 48. 1888. Vancouver Island, *Macoun* in 1887.

Calamagrostis aleutica patens Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 20. 1898. Mendocino, Calif. [probably collected by *Bolander*].

(10) **Calamagrostis perplexa** Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 7. 1901. Based on *C. nemoralis* Kearney.

Calamagrostis breviseta lacustris Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 25. 1898. Fond du Lac, Minn., *Wood* in 1889.

Calamagrostis nemoralis Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 26. 1898. Not *C. nemoralis* Phil., 1896. Ithaca, N.Y., *Dudley* in 1884.

Calamagrostis pickeringii var. *lacustris* Hitchc., Rhodora 8: 210. 1906. Based on *C. breviseta lacustris* Kearney.

Calamagrostis lacustris Nash, in Britt. and Brown, Illus. Fl. ed. 2. 1: 208. 1913. Based on *C. breviseta lacustris* Kearney.

This species was erroneously referred to *Calamagrostis porteri* Gray by Dudley, Cayuga Fl. 125. 1886.

(14) **Calamagrostis pickeringii** A. Gray, Man. ed. 2. 547. 1856. White Mountains, N.H., *Pickering.*

Calamagrostis sylvatica var. *breviseta* A. Gray, Man. 582. 1848. White Mountains, N.H.

Deyeuxia pickeringii Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis pickeringii* A. Gray.

Calamagrostis breviseta Scribn., Mem. Torrey Bot. Club 5: 41. 1894. Based on *C. sylvatica* var. *breviseta* A. Gray.

Calamagrostis breviseta debilis Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 25. 1898. Newfoundland, *Robinson* and *Schrenk* 205.

Calamagrostis pickeringii var. *debilis* Fern. and Wieg., Rhodora 15: 135. 1913. Based on *C. breviseta debilis* Kearney.

(9) **Calamagrostis porteri** A. Gray, Amer. Acad. Sci. Proc. 6: 79. 1862. Huntingdon County, Pa., *Porter* in 1862.

Deyeuxia porteri Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis porteri* A. Gray.

(6) **Calamagrostis purpurascens** R. Br., in Richards., Bot. App. Franklin Jour. 731. 1823. Northern British America.

Arundo purpurascens Schult., Mant. 2: 603. 1824. Based on *Calamagrostis purpurascens* R. Br.

Deyeuxia purpurascens Kunth, Rév. Gram. 1: 77. 1829. Based on *Calamagrostis purpurascens* R. Br.

Calamagrostis sylvatica var. *purpurascens* Thurb.; Vasey, Contrib. U.S. Natl. Herb. 3: 83. 1892. [Mount Dana,] Calif., *Bolander* 5071.

Calamagrostis sylvatica var. *americana* Vasey, Contrib. U.S. Natl. Herb. 3: 83. 1892. British America to Colorado. [Type, Pen Gulch, Colo., *Vasey* in 1884.]

Calamagrostis arctica Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13²: pl. 55. 1893. St. Paul Island, Bering Sea, *J. M. Macoun.*

Calamagrostis vaseyi Beal, Grasses N.Amer. 2: 344. 1896. Cascade Mountains, Wash., *Vasey.*

Calamagrostis purpurascens arctica Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 19. 1898. Based on *C. arctica* Vasey.

Calamagrostis yukonensis Nash, Bull. N.Y. Bot. Gard. 2: 154. 1901. Dawson, Yukon Territory, *R. S. Williams.*

Calamagrostis purpurascens var. *vaseyi* Jones, Contrib. West Bot. 14: 9. 1912. Based on *C. vaseyi* Beal.

This species has been referred to *Deyeuxia sylvatica* (DC.) Kunth by American authors.

(8) **Calamagrostis rubescens** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 92. 1863. Oregon, *Nuttall.*

Deyeuxia rubescens Vasey, Grasses U.S. 28. 1883. Based on *Calamagrostis rubescens* Buckl.

Deyeuxia cusickii Vasey, Bot. Gaz. 10: 224. 1885. Eagle Mountains, Oreg., *Cusick* 1159.

Deyeuxia suksdorfii Scribn., Bull. Torrey Bot. Club 15: 9. pl. 76. 1888. Washington, *Suksdorf* 26.

Calamagrostis aleutica var. *angusta* Vasey, Contrib. U.S. Natl. Herb. 3: 80. 1892. Santa Cruz, Calif., *Anderson.*

Calamagrostis cusickii Vasey, Contrib. U.S. Natl. Herb. 3: 81. 1892. Based on *Deyeuxia cusickii* Vasey.

Calamagrostis suksdorfii Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 82. 1892. Based on *Deyeuxia suksdorfii* Scribn.

Calamagrostis angusta Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 21. 1898. Based on *C. aleutica* var. *angusta* Vasey.

Calamagrostis subflexuosa Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 22. 1898. Oakland, Calif., *Bolander* 2274.

Calamagrostis fasciculata Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 23. 1898. Mendocino County, Calif., *Pringle* in 1882.

Calamagrostis suksdorfii luxurians Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 24. 1898. Coeur d'Alene Lake, Idaho, *Sandberg, Heller* and *McDougal* 630.

This species has been referred by some American authors to *Calamagrostis sylvatica* DC., and to *Deyeuxia varia* Kunth.

(19) **Calamagrostis scopulorum** Jones, Calif. Acad. Sci. Proc. II. 5: 722. 1895. Springdale, Utah, *Jones* 6075.

Calamagrostis scopulorum lucidula Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 11: 33. 1898. Wasatch Mountains, Utah, *Jones* 1145.

(15) **Calamagrostis scribneri** Beal, Grasses N.Amer. 2: 343. 1896. Based on *Deyeuxia dubia* Scribn. and Tweedy.

Deyeuxia dubia Scribn. and Tweedy, Bot. Gaz. 11: 174. 1886. Not *Calamagrostis dubia* Bunge, 1854. Yellowstone Park, *Tweedy.*

Calamagrostis dubia Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 80. 1892. Based on *Deyeuxia dubia* Scribn. and Tweedy.

Calamagrostis canadensis var. *dubia* Vasey, Contrib. U.S. Natl. Herb. 3: 80. 1892. Based on *C. dubia* Scribn. and Tweedy.

Calamagrostis langsdorfii var. *scribneri* Jones, Contrib. West. Bot. 14: 9. 1912. Based on *C. scribneri* Beal.

(4) **Calamagrostis tweedyi** (Scribn.) Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 83. 1892. Based on *Deyeuxia tweedyi* Scribn.

Deyeuxia tweedyi Scribn., Bull. Torrey Bot. Club 10: 64. 1883. Cascade Mountains, Wash., *Tweedy.*

(63) CALAMOVILFA Hack.

(2) **Calamovilfa brevipilis** (Torr.) Scribn., in Hack., True Grasses 113. 1890. Based on *Arundo brevipilis* Torr.

Arundo brevipilis Torr., Fl. North. and Mid. U.S. 1: 95. 1823. Quaker Bridge, N.J.

Calamagrostis brevipilis L. C. Beck, Bot. North. and Mid. States 401. 1833. Based on *Arundo brevipilis* Torr.

Ammophila brevipilis Benth.; Vasey, Grasses U.S. 29. 1883. Based on *Calamagrostis brevipilis* Beck.

(1) **Calamovilfa curtissii** (Vasey) Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 199. f. 495. 1899. Based on *Ammophila curtissii* Vasey.
Ammophila curtissii Vasey, Bull. Torrey Bot. Club 11: 7. 1884. Indian River, Fla., *Curtiss.*
Calamagrostis curtissii Vasey, Bot. Gaz. 15: 269. 1890. Based on *Ammophila curtissii* Vasey.

(4) **Calamovilfa gigantea** (Nutt.) Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 2. 1901. Based on *Calamagrostis gigantea* Nutt.
Calamagrostis gigantea Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 143. 1837. Great Salt River of the Arkansas.
Toxeumia gigantea Nutt.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 2. 1901, as synonym of *Calamovilfa gigantea.* Salt River, Ark., *Nuttall.*

(3) **Calamovilfa longifolia** (Hook.) Scribn., in Hack., True Grasses 113. 1890. Based on *Calamagrostis longifolia* Hook.
Calamagrostis longifolia Hook., Fl. Bor. Amer. 2: 241. 1840. Saskatchewan, *Drummond.*
Vilfa rigida Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1863. "Oregon?" the locality probably erroneous.
Ammophila longifolia Benth.; Vasey, Grasses U.S. 29. 1883. Based on *Calamagrostis longifolia* Gray [error for Hook].
Atheronotus longifolius Lunell, Amer. Midl. Nat. 4: 218. 1915. Based on *Calamagrostis longifolia* Hook.

CALAMOVILFA LONGIFOLIA var. MAGNA Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 3. 1901. Mouth of Kalamazoo River, Mich., *Taylor* in 1894.

(13) CATABROSA Beauv.

(1) **Catabrosa aquatica** (L.) Beauv., Ess. Agrost. 97, 149, 157. pl. 19. f. 8. 1812. Based on *Aira aquatica* L.
Aira aquatica L. Sp. Pl. 64. 1753. Europe.
Molinia aquatica Wib., Prim. Fl. Werthem. 116. 1799. Based on *Aira aquatica* L.
Poa airoides Koel., Descr. Gram. 194. 1802. Based on *Aira aquatica* L.
Glyceria aquatica Presl, Fl. Cech. 25. 1819. Based on *Aira aquatica* L.
Hydrochloa airoides Hartm., Gen. Gram. Skand. 8. 1819. Based on *Aira aquatica* L.
Diarrhena aquatica Raspail, Ann. Sci. Nat., Bot. 5: 447. 1825. Based on *Catabrosa aquatica* Beauv.
Melica aquatica Loisel., Fl. Gall. ed. 2. 1: 59. 1828. Based on *Aira aquatica* L.
Glyceria airoides Reichenb., in Moessl., Handb. Gewächsk. ed. 2. 3: 1827. 1829. Based on *Poa airoides* Koel.
Colpodium aquaticum Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 395. 1830. Based on *Aira aquatica* L.
Glyceria catabrosa Klett and Richt., Fl. Leipzig 96. 1830. Based on *Catabrosa aquatica* Beauv.
Catapodium aquaticum Trin.; Willk. and Lange, Prodr. Fl. Hisp. 1: 77. 1861, as synonym of *Catabrosa aquatica* Beauv.

(105) CATHESTECUM Presl

(1) **Cathestecum erectum** Vasey and Hack., Bull. Torrey Bot. Club 11: 37. pl. 45. 1884. Presidio, Tex., *Havard.*
This is the species described and figured by Scribner (U.S.Dept.Agr., Div. Agrost. Bull. 7: 242. f. 224. 1897) under the name *Cathestecum prostratum* Presl.

(137) CENCHRUS L.[18]

Cenchrus barbatus Schum., Beskr. Guin. Pl. 63. 1827. Guinea, Africa.
Cenchrus catharticus Delile, Cat. Hort. Monsp. 1838: 4. 1839. Grown from seed from Nubia, Africa.

(3) **Cenchrus echinatus** L., Sp. Pl. 1050. 1753. Jamaica, Curaçao.
Cenchrus pungens H.B.K., Nov. Gen. and Sp. 1: 115. 1815. Guayaquil, Ecuador, *Humboldt* and *Bonpland.*
Cenchrus brevisetus Fourn., Mex. Pl. 2: 50. 1886. Orizaba, Mexico, *Schaffner* 198; *Bourgeau* 3140; *Botteri* 133.

[18] For discussion of types see Chase, Contrib. U.S. Natl. Herb. 22: 52–76. 1920.

Cenchrus echinatus brevisetus Scribn., in Millsp., Field Mus. Bot. 2: 26. 1900. Based on *Cenchrus brevisetus* Fourn.

(4) **Cenchrus gracillimus** Nash, Bull. Torrey Bot. Club 22: 299. 1895. Eustis, Fla., *Nash* 188 [type], 288.

(5) **Cenchrus incertus** M. A. Curtis, Jour. Bost. Soc. Nat. Hist. 1: 135. 1837. Smithville, N.C., *Curtis*.

?*Cenchrus carolinianus* Walt., Fl. Carol. 79. 1788. South Carolina.

Cenchrus strictus Chapm., Bot. Gaz. 3: 20. 1878. West Florida, [*Chapman*].

?*Nastus carolinianus* Lunell, Amer. Midl. Nat. 4: 214. 1915. Based on *Cenchrus carolinianus* Walt.

(1) **Cenchrus myosuroides** H.B.K., Nov. Gen. and Sp. 1: 115. pl. 35. 1815. Flamingo Key, Cuba, *Humboldt* and *Bonpland*.

Panicum cenchroides Ell., Bot. S.C. and Ga. 1: 111. 1816. Not *P. cenchroides* L. Rich., 1792. Jekyl Island, Ga., *Baldwin*.

Pennisetum pungens Nutt., Gen. Pl. 1: 54. 1818. Based on *Panicum cenchroides* Ell.

Setaria elliottiana Schult., Mant. 2: 279. 1824. Based on *Panicum cenchroides* Ell.

Pennisetum myosuroides Spreng., Syst. Veg. 1: 303. 1825. Based on *Cenchrus myosuroides* H.B.K.

Cenchrus elliottii Kunth, Rév. Gram. 1: 51. 1829. Based on *Panicum cenchroides* Ell.

Cenchrus alopecuroides Presl, Rel. Haenk. 1: 317. 1830. Not *C. alopecuroides* Thunb., 1794. Original locality unknown, probably Peru.

Cenchrus setoides Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 2. 1866. Northern Texas, [*Linscum* and *Buckley*].

Cenchropsis myosuroides Nash, in Small, Fl. Southeast. U.S. 109, 1327. 1903. Based on *Cenchrus myosuroides* H.B.K.

(6) **Cenchrus pauciflorus** Benth., Bot. Voy. Sulph. 56. 1840. Magdalena Bay, Baja California, [*Barclay*].

Cenchrus roseus Fourn., Mex. Pl. 2: 50. 1886. Vera Cruz, Mexico, *Gouin* 42 in part, 43.

Cenchrus echinatus forma *longispina* Hack., in Kneucker, Allg. Bot. Ztschr. 9: 169. 1903. Oxford, Conn., Gram. Exs. *Kneucker* 426.

(7) **Cenchrus tribuloides** L., Sp. Pl. 1050. 1753. Seacoast of Virginia, [*Clayton*].

Cenchrus echinatus var. *tribuloides* Torr., Fl. North. and Mid. U.S. 1: 69. 1823. Based on *C. tribuloides* L.

Cenchrus vaginatus Steud., Syn. Pl. Glum. 1: 110. 1854. Cultivated in the botanical garden, Paris.

Cenchrus tribuloides var. *macrocephalus* Doell, in Mart., Fl. Bras. 2^2: 312. 1877. Brazil, *Martius*.

Cenchrus macrocephalus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 110. f. 406. 1899. Based on *C. tribuloides* var. *macrocephalus* Doell.

(2) **Cenchrus viridis** Spreng., Syst. Veg. 1: 301. 1825. Guadeloupe, [*Bertero*].

Cenchrus echinatus var. *viridis* Spreng.; Griseb., Fl. Brit. W. Ind. 556. 1864. Presumably based on *C. viridis* Spreng.

(102) CHLORIS Swartz

(7) **Chloris andropogonoides** Fourn., Mex. Pl. 2: 143. 1886. San Luis Potosí, Mexico, *Virlet* 1462.

Chloris tenuispica Nash, Bull. Torrey Bot. Club 25: 436. 1898. Texas, *Nealley* in 1889.

(6) **Chloris chloridea** (Presl) Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Based on *Dineba chloridea* Presl.

Dineba chloridea Presl, Rel. Haenk. 1: 291. 1830. Mexico, *Haenke*.

Eutriana chloridea Kunth, Rév. Gram. 1: Sup. XXIII. 1830. Based on *Dineba chloridea* Presl.

Gymnopogon longifolius Fourn., Mex. Pl. 2: 144. 1886. Vera Cruz, Mexico, *Gouin* 52.

Gymnopogon virletii Fourn., Mex. Pl. 2: 144. 1886. San Luis Potosí, Mexico, *Virlet* 1441.

Chloris longifolia Vasey, Contrib. U.S. Natl. Herb. 1: 284. pl. 19. 1893. Not *C. longifolia* Steud., 1854. Based on *Gymnopogon longifolius* Fourn.

Chloris clandestina Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 24: 25. 1901. Based on *Gymnopogon longifolius* Fourn.

(11) **Chloris ciliata** Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Jamaica, *Swartz*.

Cynodon ciliatus Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Chloris ciliata* Swartz.
Chloris propinqua Steud., Syn. Pl. Glum. 1: 204. 1854. Guadeloupe, *Duchaissing.*
Chloris ciliata var. *texana* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12[1]: pl. 30. 1890. Brownsville, Tex., [*Nealley*].
Chloris texana Nash, Bull. Torrey Bot. Club 25: 441. 1898. Based on *C. ciliata* var. *texana* Vasey.
Chloris nashii Heller, Muhlenbergia 5: 120. 1909. Based on *C. texana* Nash.
(15) **Chloris cucullata** Bisch., Ann. Sci. Nat., Bot. III. 19: 357. 1853. Cultivated, seed from Matamoros, Mexico.
Chloris distichophylla Lag., Gen. and Sp. Nov. 4. 1816. Argentina and Chile.
Eustachys distichophylla Nees, Agrost. Bras. 418. 1829. Based on *Chloris distichophylla* Lag.
(3) **Chloris floridana** (Chapm.) Wood, Amer. Bot. and Flor. pt. 2: 407. 1871. Based on *Eustachys floridana* Chapm.
Eustachys floridana Chapm., Fl. South. U.S. 557. 1860. Middle Florida.
(5) **Chloris gayana** Kunth, Rév. Gram. 1: 89. 1829. Senegal, Africa.
(1) **Chloris glauca** (Chapm.) Wood, Amer. Bot. and Flor. pt. 2: 407. 1871. Based on *Eustachys glauca* Chapm.
Eustachys glauca Chapm., Fl. South. U.S 557. 1860. West Florida.
(14) **Chloris latisquamea** Nash, Bull. Torrey Bot. Club 25: 439. 1898. Kerrville, Tex., *Heller* 1767.
Chloris verticillata var. *intermedia* Vasey, in Coult., Contr. U.S. Nat. Herb. 2: 528. 1894. Texas, [Houston, *Hall* 773].
(4) **Chloris neglecta** Nash, Bull. Torrey Bot. Club 22: 423. 1895. Orange Bend, Fla., *Nash* 2149.
Eustachys neglecta Nash, Bull. Torrey Bot. Club 25: 450. 1898. Based on *Chloris neglecta* Nash.
(2) **Chloris petraea** Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Jamaica, *Swartz.*
?*Aira aegilopsoides* Walt., Fl. Carol. 78. 1788. South Carolina.
Agrostis complanata Ait., Hort. Kew. 1: 96. 1789. Grown in England, seed from Jamaica.
Eustachys petraea Desv., Nouv. Bull. Soc. Philom. Paris 2: 189. 1810. Based on *Chloris petraea* Swartz.
Schultesia petraea Spreng., Pl. Pugill. 2: 17. 1815. Based on *Chloris petraea* Swartz.
Aira complanata Steud., Nom. Bot. ed. 2. 1: 44. 1840, as synonym of *Chloris petraea* Swartz.
Chloris swartzii C. Muell., Bot. Ztg. 19: 341. 1861. Based on *C. petraea* Swartz.
Chloris septentrionalis C. Muell., Bot. Ztg. 19: 340. 1861. Rio Brazos, Tex., *Drummond.*
Chloris swartziana Doell, in Mart., Fl. Bras. 2[3]: 68. 1878. Based on *C. petraea* Swartz.
(10) **Chloris polydactyla** (L.) Swartz, Prodr. Veg. Ind. Occ. 26. 1788. Based on *Andropogon polydactylon* L.
Andropogon barbatus L., Syst. Nat. ed. 10. 2: 1305. 1759. Jamaica. Not *Chloris barbata* Swartz, 1797, based on *A. barbatus* L., 1771, from the East Indies, which is *C. inflata* Link (*C. paraguayensis* Steud.).
Andropogon polydactylon L., Sp. Pl. ed. 2. 2: 1483. 1763. Jamaica. Diagnosis of *A. barbatus* L. (1759) copied.
Saccharum polydactylum Thunb., Fl. Jap. 42. 1784. Based on *Andropogon polydactylon* L.
Chloris barbata Nash, Bull. Torrey Bot. Club 25: 443. 1898. Not *C. barbata* Swartz, 1797. Based on *Andropogon barbatus* L. (1759).
Chloris prieurii Kunth, Rév. Gram. 1: 89. 1829. Senegambia, Africa.
Chloris radiata (L.) Swartz, Prodr. Veg. Ind. Occ. 26. 1788. Based on *Agrostis radiata* L.
Agrostis radiata L., Syst. Nat. ed. 10. 2: 873. 1759. Jamaica.
Chloris glaucescens Steud., Syn. Pl. Glum. 1: 206. 1854. Guadeloupe, *Duchaissing.*
(13) **Chloris subdolichostachya** C. Muell., Bot. Ztg. 19: 341. 1861. Texas, *Drummond* 372.
Chloris verticillata var. *aristulata* Torr. and Gray, U.S. Rep. Expl. Miss. Pacif. 2: 176. 1855. Lower Rio Grande, *Gregg.*
Chloris brevispica Nash, Bull. Torrey Bot. Club 25: 438 1898. Nueces County, Tex., *Heller* 1471.

(8) **Chloris texensis** Nash, Bull. Torrey Bot. Club 23: 151. 1896. Texas, *Thurow; Nealley.*
Chloris nealleyi Nash, Bull. Torrey Bot. Club 25: 435. 1898. Based on *C. texensis* Nash.
Chloris truncata R. Br., Prodr. Fl. Nov. Holl. 186. 1810. Australia.
(12) **Chloris verticillata** Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 150. 1837. Fort Smith, Ark., [*Nuttall*].
(9) **Chloris virgata** Swartz, Fl. Ind. Occ. 1: 203. 1797. Antigua, *Swartz.*
Chloris pubescens Lag., Var. Cien. 2^4: 143. 1805. Peru.
Rabdochloa virgata Beauv., Ess. Agrost. 84, 158. 1812. Presumably based on *Chloris virgata* Swartz.
Chloris compressa DC., Cat. Hort. Monsp. 94. 1813. Cultivated at Montpellier.
Chloris elegans H.B.K., Nov. Gen. and Sp. 1: 166. pl. 49. 1816. Mexico, *Humboldt* and *Bonpland.*
Chloris alba Presl, Rel. Haenk. 1: 289. 1830. Mexico, *Haenke.*
Chloris penicillata Willd.; Steud., Nom. Bot. ed. 2. 1: 353. 1840, as synonym of *C. elegans* H.B.K.
Chloris alba var. *aristulata* Torr., U.S. Rept. Expl. Miss. Pacif. 4: 155. 1857. Banks of the upper Rio Grande [*Emory* Exped.]; Tex., *Drummond* 395 also mentioned.
Agrostomia barbata Cervant., Naturaleza 1870: 346. 1870. Cuernavaca, Mexico.

(67) CINNA L.

(1) **Cinna arundinacea** L., Sp. Pl. 5. 1753. Canada, *Kalm.*
Agrostis cinna Retz., Obs. Bot. 5: 18. 1789. Based on *Cinna arundinacea* L., but, according to Obs. Bot. 6: 12. 1791, misapplied to a species of *Muhlenbergia.*
Agrostis cinna Lam., Tabl. Encycl. 1: 162. 1791. Based on *Cinna arundinacea* L., but misapplied to *Muhlenbergia mexicana.*
Agrostis cinna Pursh, Fl. Amer. Sept. 1: 64. 1814. Based on *Cinna arundinacea* Willd. (error for L.).
Cinna agrostoides Beauv.; Steud., Nom. Bot. 1: 20, 198. 1821, as synonym of *Agrostis cinna* Lam.
Muhlenbergia cinna Trin., Gram. Unifl. 191. 1824. Based on *Agrostis cinna* Lam.
(2) **Cinna latifolia** (Trevir.) Griseb., in Ledeb., Fl. Ross. 4: 435. 1853. Based on *Agrostis latifolia* Trevir.
Agrostis latifolia Trevir.; Göpp., Beschr. Bot. Gart. Breslau 82. 1830. Europe.
Muhlenbergia pendula Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 172. 1832. Sitka.
Cinna expansa Link, Hort. Berol. 2: 236. 1833. Western North America, *Richardson.*
Cinna pendula Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 280. 1841. Norway, Sitka, Baikal. The earlier *Muhlenbergia pendula* Trin., not mentioned.
Cinna arundinacea var. *pendula* A. Gray, Man. ed. 2. 545. 1856. Based on *C. pendula* Trin.
Cinna pendula var. *glomerula* Scribn., Acad. Nat. Sci. Phila. Proc. 1884: 290. 1884. Washington, *Twecdy.*
Cinna bolanderi Scribn., Acad. Nat. Sci. Phila. Proc. 1884: 290. 1884. California, *Bolander* 6090.
Cinna pendula var. *acutiflora* Vasey; Macoun, Cat. Can. Pl. 2^4: 203. 1888, name only, Vancouver Island; 2^5: 393. 1890, as synonym of *C. pendula* var. *glomerata* Scribn. [error for var. *glomerula*].
Cinna pendula var. *mutica* Vasey, in Macoun, Cat. Can. Pl. 2^4: 202. 1888. Name only for collection at Pelly Banks, Northwest Territory, *Dawson* in 1887. Vasey, Contrib. U.S. Natl. Herb. 3: 57. 1892. Oregon, [*Cusick*].
Cinna pendula var. *bolanderi* Vasey, Contrib. U.S. Natl. Herb. 3: 57. 1892. Based on *C. bolanderi* Scribn.

(156) COIX L.

(1) **Coix lacryma-jobi** L., Sp. Pl. 972. 1753. India.
Coix lacryma L., Syst. Nat. ed. 10. 1261. 1759. Based on *C. lacryma-jobi* L.
Lithagrostis lacryma-jobi Gaertn., Fruct. and Sem. 1: 7. 1788. Based on *Coix lacryma-jobi* L.

Sphaerium lacryma Kuntze, Rev. Gen. Pl. 2: 793. 1891. Based on *Coix lacryma* L.

(66) COLEANTHUS Seidel

(1) **Coleanthus subtilis** (Tratt.) Seidel; Roem. and Schult., Syst. Veg. 2: 276. 1817. Based on *Schmidtia subtilis* Tratt.
Schmidtia subtilis Tratt., Fl. Austr. 1: 12. 1816. Bohemia.
Zizania subtilis Raspail, Ann. Sci. Nat., Bot. 5: 452, 458. 1825. Based on *Coleanthus subtilis* [Seidel] Roem. and Schult.
Wilibaldia subtilis Roth, Enum. Pl. Phan. Germ. 1: 92. 1827. Based on *Schmidtia subtilis* Tratt.

CORIDOCHLOA Nees

Coridochloa cimicina (L.) Nees; Jacks., Ind. Kew. 1: 618. 1893, as synonym of *Panicum cimicinum*. Chase, Biol. Soc. Wash. Proc. 24: 129. 1911. This name is usually credited to Nees, Edinb. New Phil. Journ. 15: 381. 1833, but though Nees adds, after briefly distinguishing the genus, that its type is *Panicum cimicinum* Retz., he does not transfer the name to *Coridochloa*.
Milium cimicinum L., Mant. Pl. 2: 184. 1771. Malabar, India.
Panicum cimicinum Retz., Obs. Bot. 3: 9. 1783. Based on *Milium cimicinum* L.
Axonopus? cimicinus Beauv., Ess. Agrost. 12, 154. 1812. Based on *Milium cimicinum* L.

(25) CORTADERIA Stapf

Cortaderia rudiuscula Stapf, Gard. Chron. III. 22: 396. 1897. Argentina.
This is the species described by Stapf under *C. quila* (Nees) Stapf, but that name is ultimately based on *Arundo quila* Molino, a species of bamboo, *Chusquea quila* (Molino) Kunth.
(1) **Cortaderia selloana** (Schult.) Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 325. 1900. Based on *Arundo selloana* Schult.
Arundo dioeca Spreng., Syst. Veg. 1: 361. 1825. Not *A. dioica* Lour. 1793. Monte Video, Uruguay, *Sello*.
Arundo selloana Schult., Mant. 3 (Add. 1): 605. 1827. Based on *A. dioeca* Spreng. Schultes cites "*A. dioeca* Spreng., S.V. p. 361", hence the date is later than 1824, the title-page date.
Gynerium argenteum Nees, Agrost. Bras. 462. 1829. Brazil.
Cortaderia argentea Stapf, Gard. Chron. III. 22: 396. 1897. Based on *Gynerium argenteum* Nees.
Cortaderia dioica Spcg., An. Mus. Nac. Buenos Aires 7: 194. 1902. Based on *Arundo dioica* Spreng.
Corynephorus canescens (L.) Beauv., Ess. Agrost. 90, 149, 159. 1812. Based on *Aira canescens* L.
Aira canescens L., Sp. Pl. 65. 1753. Europe.
Avena canescens Web., in Wigg., Prim. Fl. Hols. 9. 1780. Based on *Aira canescens* L.
Weingaertneria canescens Bernh., Syst. Verz. Pflanz. 51. 1800. Based on *Aira canescens* L.

(36) COTTEA Kunth

(1) **Cottea pappophoroides** Kunth, Rév. Gram. 1: 84. 1829. Peru.

(78) CRYPSIS Ait.

(1) **Crypsis aculeata** (L.) Ait., Hort. Kew. 1: 48. 1789. Based on *Anthoxanthum aculeatum* L. f.
Schoenus aculeatus L., Sp. Pl. 42. 1753. Southern Europe.
Agrostis aculeata Scop., Fl. Carn. ed. 2. 1: 62. 1772. Based on *Schoenus aculeatus* L.
Phleum aculeatum Lam., Fl. Franç. 3: 563. 1778. Based on *Schoenus aculeatus* L.
Anthoxanthum aculeatum L. f., Sup. Pl. 89. 1781. Based on *Schoenus aculeatus* L.

Antitragus aculeatus Gaertn., Fruct. and Sem. 2: 7. 1791. Based on *Schoenus aculeatus* L.

Pallasia aculeata Kuntze, Rev. Gen. Pl. 2: 781. 1891. Based on *Crypsis aculeata* Ait.

(100) CTENIUM Panzer

(1) **Ctenium aromaticum** (Walt.) Wood, Class-book 806. ed. 3. 1861. Based on *Aegilops aromatica* Walt.

?*Nardus gangitis* L., Sp. Pl. 53. 1753. Garden specimen, southern France, (probably Montpellier). The specimen under this name in the Linnaean Herbarium is from Montpellier, and is said by Munro (Jour. Linn. Soc. Bot. 6: 35. 1862) to be *Lepturus incurvatus* Trin. (*Pholiurus incurvus* (L.) Schinz and Thell.). The Linnaean citations refer to *Andropogon* and to *Rottboellia* according to Trinius (Clav. Agrost. 346. 1822), except that to Morison (Pl. Hist. 3: Sect. 8, tab. 3, last figure) which is a species of *Ctenium*. Linnaeus gives as the origin of his plant "Habitat in G. Narbonensi" (Gallia Narbonensis is southern France). The application of the name *N. gangitis* is too uncertain to be accepted for *Ctenium aromaticum*, as proposed by Druce.

Aegilops aromatica Walt., Fl. Carol. 249. 1788. South Carolina.

Nardus scorpioides Lam., Tabl. Encycl. 1: 152. 1791. America.

Chloris monostachya Michx., Fl. Bor. Amer. 1: 59. 1803. South Carolina, *Michaux.*

Campulosus gracilior Desv., Nouv. Bull. Soc. Philom. (Paris) 2: 189. 1810. Based on *Chloris monostachya* Michx.

Campulosus monostachyus Beauv., Ess. Agrost. 64, 157, 158. pl. 13. f. 1. 1812. Based on *Chloris monostachya* Michx.

Ctenium carolinianum Panz., Denkschr. Bayer. Akad. Wiss. 4: 311. pl. 13. f. 1, 2. 1813. South Carolina.

Campuloa gracilis Desv., Jour. Bot. 1: 69. 1813. Based on *Chloris monostachya* Michx.

Monocera aromatica Ell., Bot. S.C. and Ga. 1: 177. pl. 11. f. 3. 1816. Based on *Aegilops aromatica* Walt.

Campuloa monostachya Roem. and Schult., Syst. Veg. 2: 516. 1817. Based on *Chloris monostachya* Michx.

Cynodon monostachyos Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Campulosus monostachyus* Desv. [error for Beauv.].

Ctenium americanum Spreng., Syst. Veg. 1: 274. 1825. North America, *Chloris monostachya* Michx., cited as synonym.

Campulosus aromaticus Trin.; Steud., Nom. Bot. ed. 2. 1: 272. 1840, as synonym of *C. monostachyus* Beauv.

Chloris piperita Michx.; Steud., Nom. Bot. ed. 2. 1: 353. 1840, as synonym of *Campulosus monostachyus* Beauv.

Rottboellia scorpioides Poir.; Steud., Nom. Bot. ed. 2. 2: 474. 1841, as synonym of *Ctenium americanum* Spreng.

Campulosus gracilis Bertol., Mem. Accad. Sci. Bologna 2: 602. pl. 43. f. a.b.c. 1850. Alabama.

?*Campulosus gangitis* Kuntze, Rev. Gen. Pl. 2: 764. 1891. Based on *Nardus gangitis* L., taken up for *Ctenium aromaticum.*

Campulosus aromaticus Scribn., Mem. Torrey Bot. Club 5: 45. 1895. Based *on Aegilops aromaticus* Walt.

?*Ctenium gangitum* Druce, Rept. Bot. Exch. Club Brit. Isles 3: 416. 1914. Based on *Nardus gangitis* L., taken up for *C. aromaticum.*

(2) **Ctenium floridanum** (Hitchc.) Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Based on *Campulosus floridanus* Hitchc.

Campulosus floridanus Hitchc., Amer. Jour. Bot. 2: 306. 1915. East Florida, *Curtiss* in 1875.

This is the species described by Scribner (U.S.Dept.Agr., Div. Agrost. Bull. 7: 197. f. 179. 1897) and by Nash (Small, Fl. Southeast. U.S. 133. 1903) under *Campulosus chapadensis* Trin. That is a Brazilian species not known from North America.

Cutandia memphitica (Spreng.) Richt. Pl. Eur. 1: 77. 1890. Based on *Dactylis memphitica* Spreng.

Dactylis memphitica Spreng., Nachtr. Bot. Gart. Halle 20. 1801. Egypt.

CYMBOPOGON Spreng.

Cymbopogon citratus (DC.) Stapf, Kew Bull. Misc. Inf. 1906: 322. 1906. Based on *Andropogon citratus* DC.
Andropogon citratus DC., Cat. Hort. Monsp. 78. 1813, without description. DC.; Nees, Allg. Gartenz. 3: 266. 1835. Garden plant.
Cymbopogon nardus (L.) Rendle, Cat. Afr. Pl. Welw. 2: 155. 1899. Based on *Andropogon nardus* L.
Andropogon nardus L., Sp. Pl. 1046. 1753. India.
Sorghum nardus Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon nardus* L.

(95) CYNODON L. Rich.

(1) **Cynodon dactylon** (L.) Pers., Syn. Pl. 1: 85. 1805. Based on *Panicum dactylon* L.
Panicum dactylon L., Sp. Pl. 58. 1753. Southern Europe.
Digitaria dactylon Scop., Fl. Carn. ed. 2. 1: 52. 1772. Based on *Panicum dactylon* L.
Dactilon officinale Vill., Hist. Pl. Dauph. 2: 69. 1787. Based on *Panicum dactylon* L.
?*Cynosurus uniflorus* Walt., Fl. Carol. 82. 1788. South Carolina.
Paspalum dactylon Lam., Tabl. Encycl. 1: 176. 1791. Based on *Panicum dactylon* L.
Digitaria littoralis Salisb., Prodr. Stirp. 19. 1796. Based on *Panicum dactylon* L.
Milium dactylon Moench, Meth. Pl. Sup. 67. 1802. Based on *Panicum dactylon* L.
Fibichia umbellata Koel., Descr. Gram. 308. 1802. Based on *Panicum dactylon* L.
Digitaria stolonifera Schrad., Fl. Germ. 1: 165. 1806. Based on *Panicum dactylon* L.
Cynodon maritimus H.B.K., Nov. Gen. and Sp. 1: 170. 1816. Peru, *Humboldt* and *Bonpland*.
Cynodon tenuis Trin., in Spreng., Neu. Entd. 2: 63. 1821. North America.
Chloris cynodon Trin., Gram. Unifl. 229. 1824. Based on *Cynodon dactylon* Pers.
Digitaria maritima Spreng., Syst. Veg. 1: 272. 1825. Based on *Cynodon maritimus* H.B.K.
Cynodon erectus Presl, Rel. Haenk. 1: 290. 1830. Mexico [type, *Haenke*] and Peru.
Agrostis bermudiana Tussac; Kunth, Enum. Pl. 1: 259. 1833, as synonym of *Cynodon dactylon* Pers.
Cynodon occidentalis Willd.; Steud., Nom. Bot. ed. 2. 1: 463. 1840, as synonym of *C. dactylon* Pers.
Cynodon portoricensis Willd.; Steud., Nom. Bot. ed. 2. 1: 463. 1840, as synonym of *C. dactylon* Pers.
Capriola dactylon Kuntze, Rev. Gen. Pl. 2: 764. 1891. Based on *Panicum dactylon* L.
Fibichia dactylon Beck, Wiss. Mitt. Bosn. Herzeg. 9: 436. 1904. Based on *Panicum dactylon* L.
Cynodon dactylon var. *maritimus* Hack., in Fries, Arkiv Bot. 8: 40. 1909. Based on *C. maritimus* H.B.K.
Capriola dactylon maritima Hitchc., U.S. Dept. Agr. Bull. 772: 179. 1920. Based on *Cynodon maritimus* H.B.K.

(22) CYNOSURUS L.

(1) **Cynosurus cristatus** L., Sp. Pl. 72. 1753. Europe.
(2) **Cynosurus echinatus** L., Sp. Pl. 72. 1753. Europe.
Phalona echinata Dum., Obs. Gram. Belg. 114. 1823. Based on *Cynosurus echinatus* L.

(21) DACTYLIS L.

1) **Dactylis glomerata** L., Sp. Pl. 71. 1753. Europe.
Bromus glomeratus Scop., Fl. Carn. ed. 2. 1: 76. 1772. Based on *Dactylis glomerata* L.
Festuca glomerata All., Fl. Pedem. 2: 252. 1785. Based on *Dactylis glomerata* L.
Trachypoa vulgaris Bubani, Fl. Pyr. 4: 359. 1901. Based on *Dactylis glomerata* L.

(94) DACTYLOCTENIUM Willd.

(1) **Dactyloctenium aegyptium** (L.) Richt., Pl. Eur. 1: 68. 1890. Based on *Cynosurus aegyptius* L.
Cynosurus aegyptius L., Sp. Pl. 72. 1753. Africa, Asia, America.
Aegilops saccharinum Walt., Fl. Carol. 249. 1788. South Carolina.
Eleusine aegyptiaca Desf., Fl. Atlant. 1: 85. 1798. Based on *Cynosurus aegyptius* L.
Eleusine pectinata Moench, Meth. Pl. Sup. 68. 1802. Based on *Cynosurus aegyptius* L.
Chloris mucronata Michx., Fl. Bor. Amer. 1: 59. 1803. Carolina, *Michaux.*
Eleusine aegyptia Pers., Syn. Pl. 1: 87. 1805. Based on *Cynosurus aegyptius* L.
Dactyloctenium aegyptiacum Willd., Enum. Pl. 1029. 1809. Based on *Cynosurus aegyptius* L.
Dactyloctenium mucronatum Willd., Enum. Pl. 1029. 1809. Based on *Chloris mucronata* Michx.
Eleusine mucronata Stokes, Bot. Mag. Med. 1: 150. 1812. Not *E. mucronata* Michx., 1803. Jamaica, *Broughton.*
Rabdochloa mucronata Beauv., Ess. Agrost. 84, 158, 176. 1812. Presumably based on *Chloris mucronata* Michx.
Cenchrus aegyptius L.; Beauv., Ess. Agrost. 157. 1812, as synonym of *Dactyloctenium aegyptium,* doubtless error for *Cynosurus.*
Eleusine cruciata Ell., Bot. S.C. and Ga. 1: 176. 1816. Presumably South Carolina.
Eleusine mucronata Hornem., Hort. Hafn. Sup. 116. 1819. Not *E. mucronata* Michx., 1803. Based on *Dactyloctenium mucronatum* Willd.
Dactyloctenium meridionale Hamilt., Prodr. Pl. Ind. Occ. 6. 1825. West Indies and tropical America.
Cynosurus carolinianus Willd.; Steud., Nom. Bot. ed. 2. 1: 465. 1840. Name only, referred to *Dactyloctenium.*
Dactyloctenium mucronatum var. *erectum* Fourn., Mex. Pl. 2: 144. 1886. Mexico, *Gouin* 68; *Karwinsky* 989, 989b.

(60) DANTHONIA Lam. and DC.

(6) **Danthonia californica** Boland., Calif. Acad. Sci. Proc. 2: 182. 1863. Oakland and San Francisco, Calif., *Bolander.*
Merathrepta californica Piper, Contrib. U.S. Natl. Herb. 11: 122. 1906. Based on *Danthonia californica* Boland.
Pentameris californica Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia californica* Boland.
DANTHONIA CALIFORNICA var. AMERICANA (Scribn.) Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *D. americana* Scribn. (Published as *D. californica americana.*)
Danthonia grandiflora Phil., An. Univ. Chile 48: 568. 1873. Not *D. grandiflora* Hochst., 1851. Province Nuble, Chile.
Danthonia americana Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 5. 1901. Based on *D. grandiflora* Phil.
Merathrepta americana Piper, Contrib. U.S. Natl. Herb. 11: 123. 1906. Based on *Danthonia americana* Scribn.
Pentameris americana Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia americana* Scribn.
Danthonia macounii Hitchc., Amer. Jour. Bot. 2: 305. 1915. Nanaimo, Vancouver Island, *Macoun* 78825.
(2) **Danthonia compressa** Austin, in Peck, N.Y. State Mus. Ann. Rept. 22: 54. 1869. Herkimer County, N.Y., *Austin* in 1868.
Danthonia spicata var. *compressa* Wood, Amer. Bot. and Flor. pt. 2: 396. 1870. Based on *D. compressa* Austin.
Danthonia alleni Austin, Bull. Torrey Bot. Club 3: 21. 1872. Rockaway, Long Island, *Allen.*
Danthonia faxoni Austin, Bull. Torrey Bot. Club 6: 190. 1877. White Mountains, N.H., *Faxon* in 1877.
Merathrepta compressa Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia compressa* Austin.
Pentameris compressa Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia compressa* Austin.
(4) **Danthonia intermedia** Vasey, Bull. Torrey Bot. Club 10: 52. 1883. California; Rocky Mountains; Plains of British America to Mount Albert, Quebec, *Allen* [in 1881, type].

Danthonia intermedia cusickii Williams, U.S.Dept.Agr., Div. Agrost. Circ. 30: 7. 1901. Oregon, *Cusick* 2427.

Merathrepta intermedia Piper, Contrib. U.S. Natl. Herb. 11: 122. 1906. Based on *Danthonia intermedia* Vasey.

Merathrepta intermedia cusickii Piper, Contrib. U.S. Natl. Herb. 11: 122. 1906. Based on *Danthonia intermedia cusickii* Williams.

Pentameris intermedia Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia intermedia* Vasey.

Danthonia cusickii Hitchc., Amer. Jour. Bot. 2: 305. 1915. Based on *D. intermedia cusickii* Williams.

(5) **Danthonia parryi** Scribn., Bot. Gaz. 21: 133. 1896. Colorado, *Parry.*

Danthonia parryi var. *longifolia* Scribn., Bot. Gaz. 21: 134. 1896. Twin Lakes, Colo., *Wolf* 1170.

Merathrepta parryi Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia parryi* Scribn.

(3) **Danthonia sericea** Nutt., Gen. Pl. 1: 71. 1818. Carolina to Florida.

Danthonia glabra Nash, Bull. Torrey Bot. Club 24: 43. 1897. Not *D. glabra* Phil., 1896. Little Stone Mountain, Ga., *Small* in 1895.

Danthonia epilis Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 7. 1901. Based on *D. glabra* Nash.

Merathrepta sericea Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia sericea* Nutt.

Pentameris epilis Nels. and Macbr., Bot. Gaz. 56: 469. 1913. Based on *Danthonia epilis* Scribn.

Pentameris sericea Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia sericea* Nutt.

This is the species described by Elliott (Bot. S.C. and Ga. 1: 174. 1816) under the name *Avena spicata* L.

(1) **Danthonia spicata** (L.) Beauv.; Roem. and Schult., Syst. Veg. 2: 690. 1817. Based on *Avena spicata* L.

Avena spicata L., Sp. Pl. 80. 1753. Pennsylvania.

Avena glumosa Michx., Fl. Bor. Amer. 1: 72. 1803. Pennsylvania; Carolina, *Michaux.* (In Index Kewensis this name is erroneously credited to Ell. Elliott cited *A. glumosa* Michx. as synonym of *A. spicata* L.)

Danthonia glumosa Beauv., Ess. Agrost. 92, 153, 160. 1812. Based on *Avena glumosa* Michx.

Avena spicaeformis Beauv., Ess. Agrost. 154. 1812, name, only Roem. and Schult., Syst. Veg. 2: 690. 1817, as synonym of *Danthonia spicata* L.

Triodia glumosa Beauv., Ess. Agrost. Atlas 12. pl. 18. f. 7. 1812. Evidently an error for *Danthonia glumosa* Beauv.

Merathrepta spicata Raf.; Jacks., Ind. Kew. 3: 211. 1894, as synonym of *Danthonia spicata.*

Danthonia spicata var. *villosa* Peck, N.Y. State Mus. Ann. Rept. 47: 168. 1894. Brownville [*Peck*] and Taberg, N.Y.

Danthonia spicata pinetorum Piper, Erythea 7: 103. 1899. Mason County, Wash., *Piper* 943.

Danthonia thermale Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 5. 1901. Yellowstone Park, Wyo., *A. Nelson* and *E. Nelson* 6140.

Danthonia spicata longipila Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 30: 7. 1901. Benton County, Ark., *Plank* 38.

Merathrepta pinetorum Piper, Contrib. U.S. Natl. Herb. 11: 122. 1906. Based on *Danthonia spicata pinetorum* Piper.

Merathrepta thermale Heller, Muhlenbergia 5: 120. 1909. Based on *Danthonia thermale* Scribn.

Merathrepta thermale var. *pinetorum* Piper; Fedde and Schust., in Just's Bot. Jahresber. 37: 128. 1911 (erroneously ascribed to Heller, Muhlenbergia 5: 120. 1909).

Pentameris spicata Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Avena spicata* L.

Pentameris thermale Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia thermale* Scribn.

Danthonia pinetorum Piper; Piper and Beattie, Fl. Northw. Coast 46. 1915. Based on *D. spicata pinetorum* Piper.

(7) **Danthonia unispicata** (Thurb.) Munro; Macoun, Cat. Can. Pl. 2^4: 215. 1888. Based on *D. californica* var. *unispicata* Thurb. The name was earlier listed without description as follows: Thurb., in A. Gray, Proc. Acad. Phila., 1863: 78. 1863, name only, for *Geyer* 189. Thurb., in S. Wats., Bot. Calif. 2: 294. 1880, as synonym of *D. californica* var. *unispicata* Thurb. Munro; Vasey, Descr. Cat. Grasses U.S. 59. 1885. Name only.

Danthonia californica var. *unispicata* Thurb., in S. Wats., Bot. Calif. 2: 294. 1880. San Diego to San Francisco, Calif., *Bolander, Parry, Lemmon.*
Merathrepta unispicata Piper, Contrib. U.S. Natl. Herb. 11: 123. 1906. Based on *Danthonia unispicata* Munro.
Pentameris unispicata Nels. and Macbr., Bot. Gaz. 56: 470. 1913. Based on *Danthonia unispicata* Munro.

(55) DESCHAMPSIA Beauv.

(3) **Deschampsia atropurpurea** (Wahl.) Scheele, Flora 27: 56. 1844. Based on *Aira atropurpurea* Wahl.
Aira atropurpurea Wahl., Fl. Lapp. 37. 1812. Lapland.
Avena atropurpurea Link, Hort. Berol. 1: 119. 1827. Based on *Aira atropurpurea* Wahl.
Holcus atropurpureus Wahl., Svensk Bot. pl. 687. 1826–29. Based on *Aira atropurpurea* Wahl.
Aira latifolia Hook., Fl. Bor. Amer. 2: 243. pl. 227. 1840. Rocky Mountains, *Drummond.*
Vahlodea atropurpurea Fries, Bot. Not. 178. 1842. Presumably based on *Aira atropurpurea* Wahl.
Deschampsia latifolia Vasey, Grasses U.S. 29. 1883. Not *D. latifolia* Hochst., 1851. Based on *Aira latifolia* Hook.
Deschampsia hookeriana Scribn., Bot. Gaz. 11: 97. 1886. Based on *Aira latifolia* Hook.
Deschampsia atropurpurea var. *minor* Vasey, Bull. Torrey Bot. Club 15: 48. 1888. Vancouver Island, *Macoun* in 1887.
Deschampsia atropurpurea var. *latifolia* Scribn.; Macoun, Cat. Can. Pl. 2^4: 209. 1888. Based on *Aira latifolia* Hook.
(5) **Deschampsia caespitosa** (L.) Beauv., Ess. Agrost. 91, 149, 160. pl. 18. f. 3. 1812. Based on *Aira caespitosa* L.
Aira caespitosa L., Sp. Pl. 64. 1753. Europe.
Agrostis caespitosa Salisb., Prodr. Stirp. 25. 1796. Based on *Aira caespitosa* L.
Aira ambigua Michx., Fl. Bor. Amer. 1: 61. 1803. Canada, *Michaux.*
Aira caespitosa var. *ambigua* Pursh, Fl. Amer. Sept. 1: 77. 1814. Based on *A. ambigua* Michx.
Aira cespitosa Muhl., Descr. Gram. 85. 1817. Pennsylvania; New England.
Aira aristulata Torr., Fl. North. and Mid. U.S. 1: 132. 1824. New York, *Cooper.*
Campbella caespitosa Link, Hort. Berol. 1: 122. 1827. Based on *Aira caespitosa* L.
Podionapus caespitosus Dulac, Fl. Haut. Pyr. 82. 1867. Based on *Deschampsia caespitosa* Beauv.
Avena caespitosa Kuntze, Taschenfl. Leipzig 45. 1867. Based on *Aira caespitosa* L.
Aira major subsp. *caespitosa* Syme in Sowerby, English Bot. ed. 3. 11: 64. 1873. Based on *A. caespitosa* L.
Aira caespitosa var. *montana* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 294. 1878. Not *A. caespitosa* var. *montana* Reichenb., 1850. Utah, Colorado, and Arizona.
Deschampsia caespitosa var. *maritima* Vasey, Bull. Torrey Bot. Club 15: 48. 1888. Vancouver Island, *Macoun* in 1887.
Deschampsia ambigua Beauv.; Jacks., Ind. Kew. 2: 735. 1893. Name only, presumably referring to *Aira ambigua* Michx.
Deschampsia caespitosa var. *alpina* Vasey; Beal, Grasses N.Amer. 2: 368. 1896. Not *D. caespitosa* var. *alpina* Gaudin, 1869. Alaska, *Elliott;* Colorado, *Letterman.*
Deschampsia caespitosa var. *confinis* Vasey; Beal, Grasses N.Amer. 2: 369. 1896. Southern California, *Palmer* 231 in 1888.
Deschampsia caespitosa var. *longiflora* Beal, Grasses N.Amer. 2: 369. 1896. Vancouver Island, *Macoun* in 1887.
Deschampsia alpicola Rydb., Bull. Torrey Bot. Club 32: 601. 1905. Based on *D. caespitosa* var. *alpina* Vasey.
Deschampsia confinis Rydb., Bull. Torrey Bot. Club 36: 533. 1909. Based on *D. caespitosa* var. *confinis* Vasey.
Deschampsia pungens Rydb., Bull. Torrey Bot. Club 39: 103. 1912. Banff, Alberta, *McCalla* 2309.

Aira alpicola Rydb., Fl. Rocky Mount. ed. 2. 1112. 1922. Based on *Deschampsia alpicola* Rybd.

The following names based on *Deschampsia brevifolia* R. Br. (Sup. App. Parry's Voy. 191. 1821) described from Melville Island, Arctic America, and not known from the United States, have been misapplied to *D. caespitosa* by various American authors:

Aira arctica Spreng., Syst. Veg. 4: Cur. Post. 32. 1827. Based on *Deschampsia brevifolia* R. Br.

Aira caespitosa var. *arctica* Thurb.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 78. 1863. Based on *Deschempsia brevifolia* R. Br.

Deschampsia brachyphylla Nash, in Rydb., Mem. N.Y. Bot. Gard. 1: 37. 1900. Not *D. brachyphylla* Phil., 1896. Based on *D. brevifolia* R. Br.

Deschampsia curtifolia Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 7. 1901. Based on *D. brachyphylla* Nash.

Deschampsia arctica Merr., Rhodora 4: 143. 1902. Based on *Aira arctica* Spreng.

Aira curtifolia Rydb., Fl. Rocky Mount. ed. 2. 1112. 1922. Based on *Deschampsia curtifolia* Scribn.

Other names based on Old World species were misapplied to *Deschampsia caespitosa* by Beal:

Deschampsia caespitosa var. *bottnica* Vasey; Beal, Grasses N.Amer. 2: 369. 1896. Based on *Aira bottnica* Wahl.

Deschampsia caespitosa var. *brevifolia* Vasey; Beal, Grasses N.Amer. 2: 369. 1896. Based on *Aira brevifolia* Bieb.

Deschampsia caespitosa var. *montana* Vasey; Beal, Grasses N.Amer. 2: 369. 1896. Based on *D. montana* Schur.

(1) **Deschampsia danthonioides** (Trin.) Munro; Benth., Pl. Hartw. 342. 1857. Based on *Aira danthonioides* Trin.

Aira danthonioides Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 57. 1830. Western North America.

Deschampsia calycina Presl, Rel. Haenk. 1: 251. 1830. "Peru" is the published locality, but the type specimen is labeled Monterey, Calif., *Haenke.*

Aira calycina Steud., Syn. Pl. Glum. 1: 220. 1854. Based on *Deschampsia calycina* Presl.

Trisetum glabrum Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1863. "Texas *Dr. Linsecum.*" [Locality probably erroneous, the plants bearing this ticket in the herbarium of the Academy of Sciences, Philadelphia, being very like two on the same sheet labeled "Rocky Mountains of Columbia, *Nuttall.*" The species is not otherwise known east of Arizona.]

Deschampsia gracilis Vasey, Bot. Gaz. 10: 224. 1885. San Diego, Calif., *Orcutt* [1072].

(2) **Deschampsia elongata** (Hook.) Munro; Benth., Pl. Hartw. 342. 1857. Based on *Aira elongata* Hook.

Aira elongata Hook., Fl. Bor. Amer. 2: 243. pl. 228. 1840. Columbia River, *Douglas.*

Deschampsia elongata var. *ciliata* Vasey; Beal, Grasses N.Amer. 2: 371. 1896. Oregon, *Howell*; California, *Anderson*, [Santa Cruz, type].

Deschampsia elongata var. *tenuis* Vasey; Beal, Grasses N.Amer. 2: 372. 1896. Santa Cruz, Calif., *Jones* 2201. Published as new in Jepson, Fl. West. Mid. Calif. 51. 1901, *Davy* 213 (error for 4213), Evergreen, Santa Clara County, Calif., cited as type.

Deschampsia ciliata Rydb., Fl. Rocky Mount. 60. 1917. Based on *D. elongata* var. *ciliata* Vasey.

Aira vaseyana Rydb., Fl. Rocky Mount. ed. 2. 1112. 1922. Based on *Deschampsia elongata* var. *ciliata* Vasey.

(4) **Deschampsia flexuosa** (L.) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 9. 1836. Based on *Aira flexuosa* L.

Aira flexuosa L., Sp. Pl. 65. 1753. Europe.

Avena flexuosa Mert. and Koch, in Roehl, Deut. Fl. ed. 3. 1^2: 570. 1823. Based on *Aira flexuosa* L.

Avenella flexuosa Parl., Fl. Ital. 1: 246. 1848. Based on *Aira flexuosa* L.

Lerchenfeldia flexuosa Schur, Enum. Pl. Transsilv. 753. 1866. Based on *Aira flexuosa* L.

Podionapus flexuosus Dulac, Fl. Haut. Pyr. 83. 1867. Based on *Deschampsia flexuosa* Trin.

Salmasia flexuosa Bubani, Fl. Pyr. 4: 319. 1901. Based on *Aira flexuosa* L.

(6) **Deschampsia holciformis** Presl, Rel. Haenk. 1: 251. 1830. Monterey, Calif., *Haenke.*

Aira holciformis Steud., Syn. Pl. Glum. 1: 221. 1854. Based on *Deschampsia holciformis* Presl.

Desmazeria sicula (Jacq.) Dum., Comm. Bot. 27. 1822. Based on *Cynosurus siculus* Jacq. The generic name spelled *Demazeria*; later (Obs. Gram. Belg. 46. 1823) changed to *Desmazeria* by Dumortier.

Cynosurus siculus Jacq., Obs. Bot. 2: 22. pl. 43. 1767. Europe.

(15) DIARRHENA Beauv.[19]

(1) **Diarrhena americana** Beauv., Ess. Agrost. 142. pl. 25. f. 2. 1812. Based on *Festuca diandra* Michx.

Festuca diandra Michx., Fl. Bor. Amer. 1: 67. 1803. Not *F. diandra* Moench., 1794. "Kentucky, Tennessee, etc." *Michaux.*

Diarina festucoides Raf., Med. Repos. N.Y. 5: 352. 1808. Not *Diarrhena festucoides* Raspail, 1825. Based on *Festuca diandra* Michx.

Festuca americana Michx.; Beauv., Ess. Agrost. 162. 1812. Name only.

Korycarpus arundinaceus Zea; Lag., Gen. and Sp. Nov. 4. 1816. America.

Roemeria zeae Roem. and Schult., Syst. Veg. 1: 61, 287. 1817. Source unknown.

Diarina sylvatica Raf., Jour. Phys. Chym. 89: 104. 1819. Based on *Festuca diandra* Michx.

Diarrhena diandra Wood Class-book ed. 2: 612. 1847. Based on *Festuca diandra* Michx.

Corycarpus diandrus Kuntze, Rev. Gen. Pl. 2: 772. 1891. Based on *Festuca diandra* Michx.

Diarrhena festucoides Fernald, Rhodora 34: 204. 1932. Not *D. festucoides* Raspail, 1825. Based on *Diarina festucoides* Raf.

(121) DIGITARIA Heist.

(8) **Digitaria filiformis** (L.) Koel., Descr. Gram. 26. 1802. Based on *Panicum filiforme* L.

Panicum filiforme L., Sp. Pl. 57. 1753. North America, *Kalm.*

Paspalum filiforme Flügge, Monogr. Pasp. 139. 1810. Not *P. filiforme* Swartz, 1788. Based on *Panicum filiforme* L.

Paspalum furcatum var. *filiforme* Doell, in Mart., Fl. Bras. 2^2: 104. 1877. Based on *Digitaria filiformis* Muhl. (the same as Flügge) but misapplied to a species of *Axonopus.*

Syntherisma filiformis Nash, Bull. Torrey Club 22: 420. 1895. Based on *Panicum filiforme* L.

Digitaria laeviglumis Fernald, Rhodora 22: 102. 1920. Manchester, N.H., *Batchelder.*

(4) **Digitaria floridana** Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Hernando County, Fla., *Hitchcock* Fla. Pl. 2517.

(11) **Digitaria gracillima** (Scribn.) Fernald, Rhodora 22: 101. 1920. Based on *Panicum gracillimum* Scribn.

Panicum gracillimum Scribn., Bull. Torrey Bot. Club 23: 146. 1896. Eustis, Fla., *Nash* 1192.

Syntherisma gracillima Nash, Bull. Torrey Bot. Club 25: 295. 1898. Based on *Panicum gracillimum* Scribn.

Syntherisma bakeri Nash, Bull. Torrey Bot. Club 25: 296. 1898. Grasmere, Fla., *C. H. Baker* 47.

Digitaria bakeri Fernald, Rhodora 22: 102. 1920. Based on *Syntherisma bakeri* Nash.

(2) **Digitaria horizontalis** Willd., Enum. Pl. 92. 1809. Dominican Republic.

Phalaris velutina Forsk., Fl. Aegypt. Arab. 17. 1775. No exact locality given. Not *Digitaria velutina* Hitchc., 1927. [D. *velutina* Beauv., 1812 is name only.]

Milium digitatum Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Not *Digitaria digitata* Buse, 1854. Jamaica.

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[19] *Diarina* Raf., Med. Repos. N.Y. 5: 352. 1808, proposed in a review of Michaux's Flora, with a single species, *D. festucoides* Raf., based on *Festuca diandra* Michx., not *F. diandra* Moench., 1794. Since there is no description, the genus is not validly published. *Diarrhena* Beauv. (Ess. Agrost. 142, 160. pl. 25. f. 1. 1812) is described, with a single species, *D. americana* Beauv., based on *Festuca diandra* Michx. The generic name is credited (p. 160) to Schmal. [Rafinesque-Schmalz], by typographical error given as "Smart" on page 142. The changed spelling is accepted with Beauvois as author. Furthermore, *Diarrhena* is a conserved name.

Axonopus digitatus Beauv., Ess. Agrost. 12, 154. 1812. Based on *Milium digitatum* Swartz.
Digitaria setigera Roth; Roem. and Schult., Syst. Veg. 2: 474. 1817. Asia.
Panicum horizontale G. Meyer, Prim. Fl. Esseq. 54. 1818. Based on *Digitaria horizontalis* Willd.
Digitaria jamaicensis Spreng., Syst. Veg. 1: 272. 1825. Jamaica.
Digitaria setosa Desv.; Hamilt., Prodr. Pl. Ind. Occ. 6. 1825. West Indies.
Paspalum digitatum Kunth, Rév. Gram. 1: 24. 1829. Based on *Milium digitatum* Swartz.
Panicum hamiltonii Kunth, Rév. Gram. 1: Sup. IX. 1830. Based on *Digitaria setosa* Desv.
Syntherisma setosa Nash, Bull. Torrey Bot. Club 25: 300. 1898. Based on *Digitaria setosa* Desv.
Panicum sanguinale var. *digitatum* Hack.; Urban, Symb. Antill. 4: 86. 1903. Based on *Milium digitatum* Swartz.
Panicum sanguinale subsp. *horizontale* Hack., Ergeb. Bot. Exped. Akad. Wiss. Südbras. 8. 1906; Denkschr. Akad. Wiss. Math. Naturw. (Wien) 79: 69. 1908. Based on *Digitaria horizontalis* Willd.
Syntherisma digitata Hitchc., Contrib. U.S. Natl. Herb. 12: 142. 1908. Based on *Milium digitatum* Swartz.
Digitaria digitata Urban, Symb. Antill. 8: 24: 1920. Not *D. digitata* Buse, 1854. Based on *Milium digitatum* Swartz.

(3) **Digitaria ischaemum** (Schreb.) Muhl., Descr. Gram. 131. 1817. Presumably based on *Panicum ischaemum* Schreb.
Panicum ischaemum Schreb.; Schweigger, Spec. Fl. Erland. 16. 1804. Germany.
Digitaria humifusa Pers., Syn. Pl. 1: 85. 1805. France.
Syntherisma glabrum Schrad., Fl. Germ. 1: 163. pl. 3. f. 6. 1806. Germany.
Panicum glabrum Gaudin, Agrost. Helv. 1: 22. 1811. Not *P. glabrum* L., 1762. Based on *Syntherisma glabrum* Schrad. (In Index Kewensis "Ell." is erroneously given as author of *P. glabrum*.)
Digitaria glabra Beauv., Ess. Agrost. 51. 1812. Presumably based on *Syntherisma glabrum* Schrad.
Paspalum humifusum Poir., Encycl. Sup. 4: 316. 1816. Based on *Digitaria humifusa* Pers.
Panicum humifusum Kunth, Rév. Gram. 1: 33. 1829. Based on *Digitaria humifusa* Pers.
Panicum phaeocarpum var. *drummondianum* Nees, Fl. Afr. Austr. 22. 1841. St. Louis, Mo., *Drummond.*
Paspalum glabrum Wood, Amer. Bot. and Flor. pt. 2: 390. 1871. Not *P. glabrum* Poir., 1804. "(Gaud.)", given in parentheses by Wood, doubtless refers to *Panicum glabrum* Gaudin.
Paspalum glabrum Cassidy, Colo. Agr. Expt. Sta. Bull. 12: 91. 1890. Not *P. glabrum* Poir., 1804. Colorado.
Syntherisma humifusum Rydb., Mem. N.Y. Bot. Gard. 1: 469. 1900. Based on *Digitaria humifusa* Pers.
Syntherisma ischaemum Nash., N.Amer. Fl. 17: 151. 1912. Based on *Panicum ischaemum* Schreb.

The name *Panicum lineare* L. (*Syntherisma lineare* Nash) has been used for *Digitaria is chaemum* but the description does not apply (e.g. "calycis squama exterior brevior, patens, rachi adhaerens"). It is probably *Cynodon dactylon.*

DIGITARIA ISCHAEMUM var. MISSISSIPPIENSIS (Gattinger) Fernald, Rhodora 22: 103. 1920. Based on *Panicum glabrum* var. *mississippiense* Gattinger.
Panicum glabrum var. *mississippiense* Gattinger, Tenn. Fl. 95. 1887, name only, Nashville. Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 39. 1894. Knoxville, Tenn.
Panicum lineare var. *mississippiense* Gattinger; Beal, Grasses N.Amer. 2: 111. 1896. Presumably based on *P. glabrum* var. *mississippiense* Gattinger.
Syntherisma linearis mississippiensis Nash, Bull. Torrey Bot. Club. 25: 300. 1898. Based on *Panicum glabrum* var. *mississippiense* Gattinger.

(10) **Digitaria panicea** (Swartz) Urban, Symb. Antill. 8: 23. 1920. Based on *Milium paniceum* Swartz.
Milium paniceum Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Jamaica, *Swartz.*
Agrostis jamaicensis Poir., in Lam., Encycl. Sup. 1: 258. 1810. Jamaica.
Axonopus paniceus Beauv., Ess. Agrost. 12, 154. 1812. Based on *Milium paniceum* Swartz.
Syntherisma paniceum Nash, N.Amer., Fl. 17: 152. 1912. Based on *Milium paniceum* Swartz.
Digitaria dolicophylla Henr., Blumea 1: 94. 1934. Florida, *A. A. Eaton* 459.

(13) **Digitaria pauciflora** Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Southern Florida, *Eaton* 207.

(15) **Digitaria runyoni** Hitchc., Jour. Wash. Acad. Sci. 23: 455. 1933. Mouth of Rio Grande, near Brownsville, Tex., *Runyon* 188.

(1) **Digitaria sanguinalis** (L.) Scop., Fl. Carn. ed. 2. 1: 52. 1772. Based on *Panicum sanguinale* L.

Panicum sanguinale L., Sp. Pl. 57. 1753. America and southern Europe.

Dactylon sanguinalis L.; Vill., Hist. Pl. Dauph. 2: 69. 1787. Based on *Panicum sanguinale* L.

Syntherisma praecox Walt., Fl. Carol. 76. 1788. South Carolina.

Paspalum sanguinale Lam., Tabl. Encycl. 1: 176. 1791. Based on *Panicum sanguinale* L.

Digitaria praecox Willd., Enum. Pl. 91. 1809. Based on *Syntherisma praecox* Walt.

Panicum adscendens H.B.K., Nov. Gen. and Sp. 1: 97. 1815. Venezuela, Peru, and Mexico, *Humboldt* and *Bonpland.*

Cynodon praecox Roem. and Schult., Syst. Veg. 2: 412. 1817. Based on *Syntherisma praecox* Walt.

Digitaria marginata Link, Enum. Pl. 1: 102. 1821. Brazil.

Digitaria fimbriata Link, Hort. Berol. 1: 226. 1827. Brazil.

Panicum fimbriatum Kunth, Rév. Gram. 1: 33. 1829. Based on *Digitaria fimbriata* Link.

Panicum linkianum Kunth, Rév. Gram. 1: 33. 1829. Based on *Digitaria marginata* Link.

Syntherisma sanguinalis Dulac, Fl. Haut. Pyr. 77. 1867. Based on *Panicum sanguinale* L.

Syntherisma fimbriatum Nash, Bull. Torrey Bot. Club 25: 302. 1898. Based on *Digitaria fimbriata* Link.

Syntherisma marginatum Nash, N.Amer. Fl. 17: 154. 1912. Based on *Digitaria marginata* Link.

Digitaria marginata var. *fimbriata* Stapf, in Prain, Fl. Trop. Afr. 9: 440. 1919. Based on *D. fimbriata* Link.

Panicum sanguinale subsp. *marginatum* Thell., Vierteljahrs. Nat. Ges. Zürich 64: 699. 1919. Based on *Digitaria marginata* Link.

Digitaria sanguinalis var. *marginata* Fernald, Rhodora 22: 103. 1920. Based on *D. marginata* Link.

Digitaria adscendens Henr., Blumea 1: 92. 1934. Based on *Panicum adscendens* H.B.K.

Digitaria nealleyi Henr., Blumea 1: 94. 1934. Texas, Nealley in 1884. A duplicate of the type in the National Herbarium is distorted by a fungus. Described as *Syntherisma barbata* (Willd.) Nash in Small's Flora.

(6) **Digitaria serotina** (Walt.) Michx., Fl. Bor. Amer. 1: 46. 1803. Based on *Syntherisma serotinum* Walt.

Syntherisma serotinum Walt., Fl. Carol. 76. 1788. South Carolina.

Paspalum serotinum Flügge, Monogr. Pasp. 145. 1810. Based on *Digitaria serotina* Michx.

(7) **Digitaria simpsoni** (Vasey) Fernald, Rhodora 22: 103. 1920. Based on *Panicum sanguinale* var. *simpsoni* Vasey.

Panicum sanguinale var. *simpsoni* Vasey, Contrib. U.S. Natl. Herb. 3: 25. 1892. Manatee, Fla., *Simpson.*

Panicum simpsoni Beal, Grasses N.Amer. 2: 109. 1896. Based on *Panicum sanguinale* var. *simpsoni* Vasey.

Syntherisma simpsoni Nash, Bull. Torrey Bot. Club. 25: 297. 1898. Based on *Panicum sanguinale* var. *simpsoni* Vasey.

(14) **Digitaria subcalva** Hitchc., Amer. Jour. Bot. 21: 138. f. 4. 1934. Plant City, Fla., *C. P. Wright.*

(12) **Digitaria texana** Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Sarita, Tex., *Hitchcock* 5479.

(9) **Digitaria villosa** (Walt.) Pers., Syn. Pl. 1: 85. 1805. Based on *Syntherisma villosa* Walt.

Syntherisma villosa Walt., Fl. Carol. 77. 1788. South Carolina.

Digitaria pilosa Michx., Fl. Bor. Amer. 1: 45. 1803. Carolina and Georgia, *Michaux.* Willdenow (Enum. Pl. 1: 91. 1809) uses this name, doubtfully citing *D. pilosa* Michx. The description suggests that Willdenow's plant, from Carolina, is also *D. villosa.*

Paspalum carolinianum Poir., in Lam., Encycl. Sup. 4: 311. 1816. Carolina and Georgia, *Bosc.*

Syntherisma leucocoma Nash, Bull. Torrey Bot. Club 25: 295. 1898. Lake Ella, Fla., *Nash* 1155.
Panicum leucocomum Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7. (ed. 2): 58. 1898. Based on *Syntherisma leucocoma* Nash.
Digitaria leucocoma Urban, Symb. Antill. 8: 24. 1920. Based on *Syntherisma leucocoma* Nash.
Digitaria filiformis var. *villosa* Fernald, Rhodora 36: 19. 1934. Based on *Syntherisma villosa* Walt.

(5) **Digitaria violascens** Link, Hort. Berol. 1: 229. 1827. Brazil.
Panicum violascens Kunth, Rév. Gram. 1: 33. 1829. Based on *Digitaria violascens* Link.
Paspalum chinense Nees, in Hook. and Arn., Bot. Beechey Voy. 231. 1836. Macao, China.
Syntherisma chinensis Hitchc., Contrib. U.S. Natl. Herb. 22: 468. 1922. Based on *Paspalum chinense* Nees.
Digitaria chinensis A. Camus, Not. Syst. Lecomte 4: 48. 1923. Not *D. chinensis* Hornem., 1819. Based on *Paspalum chinense* Nees.

(16) DISSANTHELIUM Trin.

(1) **Dissanthelium californicum** (Nutt.) Benth., in Hook. f., Icon. Pl. III. 4: 56. pl. 1375. 1881. Based on *Stenochloa californica* Nutt.
Stenochloa californica Nutt., Jour. Acad. Sci. Phila. II. 1: 189. 1848. Santa Catalina Island, Calif., *Gambel.*

(19) DISTICHLIS Raf.

(3) **Distichlis dentata** Rydb., Bull. Torrey Bot. Club 36: 536. 1909. Washington, *Sandberg* and *Leiberg* 463.

(1) **Distichlis spicata** (L.) Greene, Calif. Acad. Sci. Bull. 2: 415. 1887. Based on *Uniola spicata* L.
Uniola spicata L., Sp. Pl. 71. 1753. Atlantic coast of North America.
Briza spicata Lam., Encycl. 1: 465. 1785. Based on *Uniola spicata* L.
? *Festuca multiflora* Walt., Fl. Carol. 81. 1788. South Carolina.
Festuca triticoides Lam., Tabl. Encycl. 1: 191. 1791. Carolina, *Fraser.*
Festuca distichophylla Michx., Fl. Bor. Amer. 1: 67. 1803. Carolina, *Michaux.*
Uniola distichophylla Roem. and Schult., Syst. Veg. 2: 596. 1817. Based on *Festuca distichophylla* Michx.
Distichlis maritima Raf., Jour. Phys. Chym. 89: 104. 1819. Based on *Uniola spicata* L.
Distichlis nodosa Raf., Jour. Phys. Chym. 89: 104. 1819. Based on *Festuca distichophylla* Michx.
Brizopyrum americanum Link, Hort. Berol. 1: 160. 1827. Based on *Uniola spicata* L.
Poa michauxii Kunth, Rév. Gram. 1: 111. 1829. Based on *Festuca distichophylla* Michx.
Brizopyrum boreale Presl, Rel. Haenk. 1: 280. 1830. Nootka Sound, Vancouver Island, *Haenke.*
Poa borealis Kunth, Rév. Gram. 1: Sup. XXVIII. 1830. Based on *Brizopyrum boreale* Presl.
Festuca triticea Lam.; Kunth, Enum. Pl. 1: 325. 1833, as synonym of *Poa michauxii* Kunth. (Probably error for *F. triticoides* Lam.)
Brizopyrum spicatum Hook. and Arn., Bot. Beechey Voy. 403. 1841. Based on *Uniola spicata* L.

(2) **Distichlis stricta** (Torr.) Rydb., Bull. Torrey Bot. Club 32: 602. 1905. Based on *Uniola stricta* Torr.
Festuca spicata Nutt., Gen. Pl. 1: 72. 1818. Not *F. spicata* Pursh, 1814. "On the banks of the Missouri."
Uniola stricta Torr., Ann. Lyc. N.Y. 1: 155. 1824. Canadian River [Okla.].
Uniola multiflora Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 148. 1837. Arkansas River, *Nuttall.*
Uniola flexuosa Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1863. Fort Belknap, Tex., *Buckley.*
Brizopyrum spicatum var. *strictum* A. Gray; S. Wats., in King, Geol. Expl. 40th Par. 5: 385. 1871. Based on *Uniola stricta* Torr.
Distichlis maritima var. *stricta* Thurb., in S. Wats., Bot. Calif. 2: 306. 1880. Based on *Uniola stricta* Torr.
Distichlis spicata stricta Scribn., Mem. Torrey Bot. Club 5: 51. 1894. Based on *Uniola stricta* Torr.

Distichlis spicata var. *laxa* Vasey; Beal, Grasses N.Amer. 2: 519. 1896. Lake Park, Utah, *Tracy* in 1887.

(4) **Distichlis texana** (Vasey) Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 16: 2. 1899. Based on *Poa texana* Vasey.

Poa texana Vasey, Contrib. U.S. Natl. Herb. 1: 60. 1890. Region of Rio Grande, Tex., *Nealley*.

Sieglingia wrightii Vasey, Contrib. U.S. Natl. Herb. 1: 269. 1893. Valley of the Limpio, Tex., *Wright* 2038.

(133) ECHINOCHLOA Beauv.[20]

(1) **Echinochloa colonum** (L.) Link, Hort. Berol. 2: 209. 1833. Based on *Panicum colonum* L.

Panicum colonum L., Syst. Nat. ed. 10. 2: 870. 1759. Jamaica, *Browne*.

Miliumco lonum Moench, Meth. Pl. 202. 1794. Based on *Panicum colonum* L.

Oplismenus colonum H.B.K., Nov. Gen. and Sp. 1: 108. 1815. Based on *Panicum colonum* L.

Panicum zonale Guss., Fl. Sic. Prodr. 1: 62. 1827. Sicily.

Oplismenus repens Presl, Rel. Haenk. 1: 321. 1830. Mexico, *Haenke*.

Oplismenus colonum var. *zonalis* Schrad. Linnaea 12: 429. 1838. Based on *Panicum zonale* Guss.

Panicum incertum Bosc; Steud., Nom. Bot. ed. 2. 2: 258. 1841. Name only. Carolina.

Echinochloa zonalis Parl., Fl. Panorm. 1: 119. 1845. Based on *Panicum zonale* Guss.

Panicum prorepens Steud., Syn. Pl. Glum. 1: 46. 1854. Based on *Oplismenus repens* Presl.

Oplismenus crusgalli var. *colonum* Coss. and Dur., Expl. Sci. Alger. 2: 28. 1854. Based on *Panicum colonum* L.

Panicum crusgalli var. *colonum* Coss.; Richt., Pl. Eur. 1: 26. 1890. Based on *P. colonum* L.

Panicum colonum var. *zonale* L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 502. 1894. Based on *P. zonale* Guss.

Echinochloa colonum var. *zonalis* Woot. and Standl., N.Mex. Coll. Agr. Bull. 81: 45. 1912. Based on *Panicum zonale* Guss.

Echinochloa crusgalli subsp. *colonum* Honda, Bot. Mag. Tokyo 37: 122. 1923. Based on *Panicum colonum* L.

Panicum crusgalli subsp. *colonum* Makino and Nemoto, Fl. Jap. 1470. 1925. Based on *P. colonum* L.

(2) **Echinochloa crusgalli** (L.) Beauv., Ess. Agrost. 53, 161. 1812. Based on *Panicum crusgalli* L.

Panicum crusgalli L., Sp. Pl. 56. 1753. Europe; Virginia.

Milium crusgalli Moench, Meth. Pl. 202. 1794. Based on *Panicum crusgalli* L.

Panicum grossum Salisb., Prod. Stirp. 18. 1796. Based on *P. crusgalli* L.

Panicum muricatum Michx., Fl. Bor. Amer. 1: 47. 1803. Not *P. muricatum* Retz., 1786. Canada, Lake Champlain [type] and Lake Ontario, *Michaux*.

?*Panicum echinatum* Willd., Enum. Pl. 1032. 1809. "America meridionali." Wiegand [21] takes up this name for *Echinochloa crus-pavonis*. The specimen in the Willdenow Herbarium named *P. echinatum* (Magdalena, Colombia, *Humboldt*) is *Pseudechinolaena polystachya* (H.B.K.) Stapf. The brief description does not apply to the specimen so named nor to *E. crus-pavonis*. Willdenow differentiates the species from *P. crusgalli* (with "glumis aristatis hispidis") by "glumis aristatus muricato-echinatus", whereas in *E. crus-pavonis* the glumes are less strongly hispid than in *E. crsugalli*.

Setaria muricata Beauv., Ess. Agrost. 51, 170, 178. 1812. Based on *Panicum muricatum* Michx.

?*Echinochloa echinata* Beauv., Ess. Agrost. 53, 161, 169. 1812. Based on *Panicum echinatum* Willd.

Panicum crusgalli var. *aristatum* Pursh, Fl. Amer. Sept. 66. 1814. North America.

Panicum pungens Poir., in Lam., Encycl. Sup. 4: 273. 1816. Based on *P. muricatum* Michx.

Pennisetum crusgalli Baumg., Enum. Stirp. Transsilv. 3: 277. 1816. Based on *Panicum crusgalli* L.

Echinochloa crusgalli var. *aristata* S. F. Gray, Nat. Arr. Brit. Pl. 2: 158. 1821. Great Britain.

[20] For discussion of types see Hitchc., Contrib. U.S. Natl. Herb. 22: 138–153. 1920.

[21] Rhodora 23: 60. 1921.

Oplismenus crusgalli Dum., Obs. Gram. Belg. 138. 1823. Based on *Panicum crusgalli* L.

?*Orthopogon echinatus* Spreng., Syst. Veg. 1: 307. 1825. Based on *Panicum echinatum* Willd.

Orthopogon crusgalli Spreng., Syst. Veg. 1: 307. 1825. Based on *Panicum crusgalli* L.

Oplismenus muricatus Kunth, Rév. Gram. 1: 44. 1829. Based on *Panicum muricatum* Michx.

?*Oplismenus echinatus* Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum echinatum* Willd.

?*Panicum crusgalli* var. *echinatum* Doell, in Mart. Fl. Bras. 2^2: 143. 1877. Based on *P. echinatum* Willd.

Echinochloa muricata Fernald, Rhodora 17: 106. 1915. Based on *Panicum muricatum* Michx.

Echinochloa crusgalli var. *muricata* Farwell, Mich. Acad. Sci. Rept. 21: 350. 1920. Based on *Panicum muricatum* Michx.

Echinochloa crusgalli var. *michauxii* House, N.Y. State Mus. Bull. 254: 71. 1924. Based on *Panicum muricatum* Michx.

Echinochloa pungens Rydb., Brittonia 1: 81. 1931. Based on *Panicum pungens* Poir.

Echinochloa crusgalli var. frumentacea W. F. Wight, Cent. Dict. Sup. 810. 1909. Presumably based on *Panicum frumentaceum* Roxb. (Published as *E. crusgalli frumentacea.*)

Panicum frumentaceum Roxb., Fl. Ind. 1: 307. 1820. Not *P. frumentaceum* Salisb., 1796. India.

Echinochloa frumentacea Link, Hort. Berol. 1: 204. 1827. Based on *Panicum frumentaceum* Roxb.

Oplismenus frumentaceus Kunth, Rév. Gram. 1: 445. 1829. Based on *Panicum frumentaceum* Roxb.

Panicum crusgalli var. *frumentaceum* Trimen, Syst. Cat. Ceylon Pl. 104. 1885. Based on *P. frumentaceum* Roxb.

Echinochloa crusgalli edulis Hitchc., U.S. Dept. Agr. Bull. 772: 238. 1920. Based on *Panicum frumentaceum* Roxb.

Echinochloa crusgalli subsp. *colonum* var. *edulis* Honda, Bot. Mag. Tokyo 37: 123. 1923. Based on *E. crusgalli* var. *edulis* Hitchc.

Echinochloa colonum var. *frumentacea* Ridl., Fl. Malay Pen. 5: 223. 1925. Presumably based on *Panicum frumentaceum* Roxb.

Panicum crusgalli subsp. *colonum* var. *edulis* Makino and Nemoto, Fl. Jap. 1470. 1925. Based on *P. frumentaceum* Roxb.

Echinochloa crusgalli var. mitis (Pursh) Peterm., Fl. Lips. 82. 1838. Based on *Panicum crusgalli* var. *mite* Pursh.

Panicum crusgalli var. *mite* Pursh, Fl. Amer. Sept. 66. 1814. North America.

Panicum crusgalli var. *purpureum* Pursh, Fl. Amer. Sept. 66. 1814. North America.

Panicum crusgalli var. *muticum* Ell., Bot. S.C. and Ga. 1: 114. 1816. Probably South Carolina.

Panicum scindens Nees; Steud., Syn. Pl. Glum. 1: 47. 1854. St. Louis, [*Drummond*].

Oplismenus crusgalli var. *muticus* Wood, Amer. Bot. and Flor. pt. 2: 393. 1870. Eastern States.

Panicum crusgalli α *normale* var. *mite* forma *hispidum* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Pennsylvania.

Echinochloa zelayensis var. *macera* Wiegand, Rhodora 23: 54. 1921. Matamoros, Mexico, *Berlandier* 890.

Echinochloa muricata var. *ludoviciana* Wiegand, Rhodora 23: 58. 1921. Baton Rouge, La., *Billings* 14.

Echinochloa muricata var. *occidentalis* Wiegand, Rhodora 23: 58. 1921. Grand Tower, Ill., *Gleason* 1720.

Echinochloa muricata var. *microstachya* Wiegand, Rhodora 23: 58. 1921. Cayuga Lake Basin, N.Y., *Palmer* 97.

Echinochloa muricata var. *multiflora* Wiegand, Rhodora 23: 59. 1921. Lincoln County, Okla., *Blankenship.*

Echinochloa microstachya Rydb., Brittonia 1: 82. 1931. Based on *E. muricata* var. *microstachya* Wiegand.

Echinochloa occidentalis Rydb., Brittonia 1: 82. 1931. Based on *E. muricata* var. *occidentalis* Wiegand.

ECHINOCHLOA CRUSGALLI var. ZELAYENSIS (H.B.K.) Hitchc., U.S. Dept. Agr. Bull. 772: 238. 1920. Based on *Oplismenus zelayensis* H.B.K. (Published as *E. crusgalli zelayensis.*)

Oplismenus zelayensis H.B.K., Nov. Gen. and Sp. 1: 108. 1815. Zelaya, Mexico, *Humboldt* and *Bonpland.*

Echinochloa zelayensis Schult., Mant. 2: 269. 1824. Based on *Oplismenus zelayensis* H.B.K.

Panicum zelayense Steud., Nom. Bot. ed. 2. 2: 265. 1841. Based on *Oplismenus zelayensis* H.B.K.

Panicum crus-pici Willd.; Doell, in Mart., Fl. Bras. 2^2: 143. 1877. Name only. South America.

?*Panicum crusgalli* α *normale* var. *pygmaeum* Kuntze, Rev. Gen. Pl. 2: 783. 1891. Colorado.

(3) **Echinochloa crus-pavonis** (H.B.K.) Schult., Mant. 2: 269. 1824. Based on *Oplismenus crus-pavonis* H.B.K.

Oplismenus crus-pavonis H.B.K., Nov. Gen. and Sp. 1: 108. 1815. Cumaná, Venezuela, *Humboldt* and *Bonpland.*

Panicum sabulicola Nees, Agrost. Bras. 258. 1829. Pará, Brazil, *Sieber;* Uruguay and Paraguay.

Panicum crus-pavonis Nees, Agrost. Bras. 259. 1829. Based on *Oplismenus crus-pavonis* H.B.K.

Echinochloa composita Presl; Nees, Agrost. Bras. 259. 1829, as synonym of *Panicum crus-pavonis* Nees. Acapulco, Mexico, *Haenke.*

Oplismenus sabulicola Kunth, Rev. Gram. 1: Sup. XI. 1830. Based on *Panicum sabulicola* Nees.

Panicum aristatum Macfad., Bot. Misc. Hook. 2: 115. 1831. Jamaica, [*Macfadden*].

Oplismenus jamaicensis Kunth, Enum. Pl. 1: 147. 1833. Based on *Panicum aristatum* Macfad.

Panicum jamaicense Steud., Nom. Bot. ed. 2. 2: 257. 1841. Based on *Oplismenus jamaicensis* Kunth.

Panicum crusgalli var. *sabulicola* Doell, in Mart., Fl. Bras. 2^2: 142. 1877. Based on *P. sabulicola* Nees.

Oplismenus angustifolius Fourn., Mex. Pl. 2: 40. 1886. Vera Cruz, Mexico, *Gouin* 54 [error for 50].

Echinochloa sabulicola Hitchc., Contrib. U.S. Natl. Herb. 17: 257. 1913. Based on *Panicum sabulicola* Nees.

Echinochloa crusgalli crus-pavonis Hitchc., Contrib. U.S. Natl. Herb. 22: 148. 1920. Based on *Oplismenus crus-pavonis* H.B.K.

Echinochloa zelayensis var. *subaristata* Wiegand, Rhodora 23: 54. 1921. Pierce, Texas, *Tracy* 7743.

(4) **Echinochloa paludigena** Wiegand, Rhodora 23: 64. 1921. Hillsborough County, Fla., *Fredholm* 6390.

Echinochloa paludigena var. *soluta* Wiegand, Rhodora 23: 64. 1921. Manatee, Fla., *Tracy* 7754.

(5) **Echinochloa walteri** (Pursh) Heller, Cat. N.Amer. Pl. ed. 2. 21. 1900. Presumably based on *Panicum walteri* Pursh, Pursh being cited in parentheses.

Panicum hirtellum Walt., Fl. Carol. 72. 1788. Not *P. hirtellum* L., 1759. South Carolina.

Panicum walteri Pursh, Fl. Amer. Sept. 66. 1814. Based on *P. hirtellum* Walter.

Panicum crusgalli var. *hispidum* Ell., Bot. S.C. and Ga. 1: 114. 1816. Based on *P. hispidum* Muhl., in manuscript.

Panicum hispidum Muhl., Descr. Gram. 107. 1817. Not *P. hispidum* Forst., 1786. New York to Carolina.

Panicum longisetum Torr., Amer. Jour. Sci. 4: 58. 1822. Not. *P. longisetum* Poir., 1816. Fox River, Wis. [*Douglass* in 1820.]

Orthopogon hispidus Spreng., Syst. Veg. 1: 307. 1825. Based on *Panicum hispidum* Muhl.

Oplismenus longisetus Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum longisetum* Torr.

Oplismenus hispidus Wood, Class-book ed. 2. 604. 1847. Based on *Panicum hispidum* Muhl.

Oplismenus crusgalli var. *hispidus* Wood, Amer. Bot. and Flor. pt. 2: 393. 1870. Presumably based on *Panicum hispidum* Muhl.

Echinochloa longearistata Nash, in Small, Fl. Southeast. U.S. 84. 1903. Louisiana, *Hale.*

Echinochloa walteri forma *laevigata* Wiegand, Rhodora 23: 62. 1921. Based on *Panicum longisetum* Torr.
Echinochloa crusgalli var. *hispida* Farwell, Amer. Midl. Nat. 9: 4. 1925. Based on *Panicum hispidum* Muhl.
Echinochloa crusgalli var. *hispida* subvar. *laevigata* Farwell, Amer. Midl. Nat. 9: 4. 1925. Based on *E. walteri* forma *laevigata* Wiegand.

(93) ELEUSINE Gaertn.

Eleusine coracana (L.) Gaertn., Fruct. and Sem. 1: 8. pl. 1. 1788. Based on *Cynosurus coracanus* L.
Cynosurus coracanus L., Syst. Nat. ed. 10. 2: 875. 1759. East Indies.
(1) **Eleusine indica** (L.) Gaertn., Fruct. and Sem. 1: 8. 1788. Based on *Cynosurus indicus* L.
Cynosurus indicus L., Sp. Pl. 72. 1753. India.
Eleusine gracilis Salisb., Prodr. Stirp. 19. 1796. Based on *Cynosurus indicus* L.
Eleusine domingensis Sieber; Schult., Mant. 2: 323. 1824. Not *E. domingensis* Pers., 1805. As synonym of *E. indica* L.
Cynodon indicus Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Eleusine indica* Lam. (error for Gaertn.).
Chloris repens Steud., Nom. Bot. ed. 2. 1: 353. 1840, as synonym of *Eleusine indica* Pers. (error for Gaertn.).
Eleusine scabra Fourn.; Hemsl., Biol. Centr. Amer. Bot. 3: 565. 1885, name only; Fourn., Mex. Pl. 2: 145. 1886. Mexico, *Bourgeau* 1030, 2378 in part, 2634, 2743; *Virlet* 1435; *Bilimek* 454; *Müller* 1392; *Gouin* 67.
Eleusine indica var. *major* Fourn., Mex. Pl. 2: 145. 1886. Mexico, *Liebmann* 222, 223, 227; *Karwinsky* 955.
Eleusine tristachya (Lam.) Lam., Tabl. Encycl. 1: 203. 1791. Based on *Cynosurus tristachyus* Lam.
Cynosurus tristachyus Lam., Tabl. Encycl. 2: 188. 1786. Uruguay, *Commerson.*

(43) ELYMUS L.

(9) **Elymus ambiguus** Vasey and Scribn., Contrib. U.S. Natl. Herb. 1: 280. 1893. Pen Gulch, Colo., *Vasey* in 1884.
ELYMUS AMBIGUUS var. STRIGOSUS (Rydb.) Hitchc., Amer. Jour. Bot. 21: 133. 1934. Based on *E. strigosus* Rydb.
Elymus strigosus Rydb., Bull. Torrey Bot. Club 32: 609. 1905. Boulder, Colo., *Letterman* 553 [type]; Wyoming, *A. Nelson* 7151.
Elymus villiflorus Rydb., Bull. Torrey Bot. Club 32: 609. 1905. Boulder, Colo., *Tweedy* 4818.
(5) **Elymus arenicola** Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Circ. 9: 7. 1899. Suferts, Oreg., *Leckenby* in 1898.
(16) **Elymus aristatus** Merr., Rhodora 4: 147. 1902. Harney County, Oreg., *Cusick* 2712.
Elymus glaucus aristatus Hitchc., in Abrams, Illustr. Fl. 1: 252. 1923. Based on *E. aristatus* Merr.
(19) **Elymus canadensis** L., Sp. Pl. 83. 1753. Canada, *Kalm.*
Elymus philadelphicus L., Cent. Pl. 1: 6. 1755; Amoen. Acad. 4: 266. 1759. *Pennsylvania,* Kalm.
Hordeum patulum Moench, Meth. Pl. 199. 1794. Garden plant, *Elymus canadensis* L., cited as synonym.
Elymus glaucifolius Muhl.; Willd., Enum. Pl. 1: 131. 1809. Pennsylvania, *Muhlenberg.*
Elymus canadensis var. *glaucifolius* Torr., Fl. North. and Mid. U.S. 1: 137. 1823. Based on *E. glaucifolius* Muhl.
Elymus canadensis var. *pendulus* Eaton and Wright, N.Amer. Bot. ed. 8. 232. 1840. No locality cited.
Sitanion brodiei Piper, Erythea 7: 100. 1899. Bishop's Bar, Snake River, Wash., *Brodie* in 1895.
Hordeum canadense Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 745. 1902. Based on *Elymus canadensis* L.
Terrellia canadensis Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus canadensis* L.
Terrellia canadensis var. *glaucifolia* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus glaucifolius* Muhl.

Elymus robustus var. *vestitus* Wiegand, Rhodora 20: 90. 1918. Cedar Point, Ohio, *MacDaniels* 106.

Elymus canadensis var. *philadelphicus* Farwell, Mich. Acad. Sci. Rept. 21: 357. 1920. Based on *E. philadelphicus* L.

Elymus philadelphicus var. *hirsutus* Farwell, Amer. Midl. Nat. 10: 314. 1927. Name proposed for *E. canadensis* as described by Wiegand (Rhodora 20: 87. 1918) "in large part."

Elymus philadelphicus var. *pendulus* Farwell, Amer. Midl. Nat. 10: 314. 1927. Based on *E. canadensis* var. *pendulus* Eaton and Wright.

Clinelymus canadensis Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 650. 1932. Based on *Elymus canadensis* L.

Elymus canadensis forma *glaucifolius* Fernald, Rhodora 35: 191. 1933. Based on *E. glaucifolius* Muhl.

Elymus wiegandii Fernald, Rhodora 35: 192. 1933. St. Francis, Maine, *Fernald* 197.

Elymus wiegandii forma *calvescens* Fernald, Rhodora 35: 192. 1933. Dead River, Maine, *Fernald* and *Strong* in 1896.

ELYMUS CANADENSIS var. BRACHYSTACHYS Farwell, Mich. Acad. Sci. Rept. 21: 357. 1920. Based on *E. brachystachys* Scribn. and Ball.

Elymus brachystachys Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 47. f. 21. 1901. Indian Territory [Oklahoma], *Palmer* 420.

Elymus philadelphicus var. *brachystachys* Farwell, Amer. Midl. Nat. 10: 314. 1927. Based on *E. bracystachys* Scribn. and Ball.

ELYMUS CANADENSIS var. ROBUSTUS (Scribn. and Smith) Mackenz. and Bush, Man. Fl. Jackson County 38. 1902. Based on *E. robustus* Scribn. and Smith.

Elymus canadensis forma *crescendus* Ramaley, Minn. Bot. Studies 1: 114. 1894. Springfield, Minn., *Sheldon* 1120.

Elymus robustus Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 37. 1897. Illinois [type, *Wolf*], Iowa, Kansas, and Montana.

Elymus crescendus Wheeler, Minn. Bot. Studies 3: 106. 1903. Based on *E. canadensis* forma *crescendus* Ramaley.

Elymus canadensis villosus Bates, Amer. Bot. 20: 17. 1914. Loup City and Arcadia, Nebr., *Bates* in 1911.

Elymus glaucifolius crescendus Bush, Amer. Midl. Nat. 10: 83. 1926. Based on *E. canadensis* forma *crescendus* Ramaley.

Elymus glaucifolius robustus Bush, Amer. Midl. Nat. 10: 87. 1926. Based on *E. robustus* Scribn. and Smith.

Elymus philadelphicus var. *robustus* Farwell, Amer. Midl. Nat. 10: 314. 1927. Based on *E. robustus* Scribn. and Smith.

(1) **Elymus caput-medusae** L., Sp. Pl. 84. 1753. Southern Europe.

Hordeum caput-medusae Coss. and Dur., Expl. Sci. Alger. 2: 198. 1867. Based on *Elymus caput-medusae* L.

(11) **Elymus condensatus** Presl, Rel. Haenk. 1: 265. 1830. Monterey, Calif. *Haenke.*

ELYMUS CONDENSATUS var. PUBENS Piper, Erythea 7: 101. 1899. Yakima City, Wash., *Piper* 2591. (Published as *E. condensatus pubens.*)

Elymus cinereus Scribn. and Merr., Bull. Torrey Bot. Club 29: 467. 1902. Pahrump Valley, Nev., *Purpus* 6050.

(4) **Elymus flavescens** Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 8: 8. f. 1. 1897. Columbus, Wash., *Suksdorf* 916.

Elymus giganteus Vahl, Symb. Bot. 3: 10. 1794. Source unknown.

(12) **Elymus glaucus** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1863. Columbia River, Oreg., *Nuttall.*

Elymus villosus var. *glabriusculus* Torr., U.S. Rept. Expl. Miss. Pacif. 4^5: 157. 1856. Napa Valley, Calif.

Elymus nitidus Vasey, Bull. Torrey Bot. Club 13: 120. 1886. Eagle Mountains, Oreg., *Cusick* [1130].

Elymus americanus Vasey and Scribn.; Macoun, Cat. Can. Pl. 2^4: 245. 1888, name only; Cassidy, Colo. Agr. Expt. Sta. Bull. 12: 57. 1890. Arapahoe Pass, Colo.

Elymus sibiricus var. *americanus* Wats. and Coult., in A. Gray, Man. ed. 6. 673. 1890. Michigan and westward.

Elymus sibiricus var. *glaucus* Ramaley, Minn. Bot. Studies 9: 112. 1894. Based on *E. glaucus* Buckl.

Elymus glaucus var. *breviaristatus* Davy, in Jepson, Fl. West. Mid. Calif. 79. 1901. Point Reyes, Calif., *Davy.*

Elymus glaucus var. *maximus* Davy, in Jepson, Fl. West. Mid. Calif. 79. 1901. Napa Valley, Calif., *Jepson.*

Elymus hispidulus Davy, in Jepson, Fl. West. Mid. Calif. 79. 1901. Olema, Calif., *Davy* 4306b.

Elymus angustifolius Davy, in Jepson, Fl. West. Mid. Calif. 80. 1901. San Francisco, Calif., *Davy.*

Elymus angustifolius var. *caespitosus* Davy, in Jepson, Fl. West. Mid. Calif. 81. 1901. Berkeley Hills, Calif., *Davy* 4255.

Elymus marginalis Rydb., Bull. Torrey Bot. Club 36: 539. 1909. Lower Arrow Lake, British Columbia, *Macoun* 44.

Terrellia glauca Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus glaucus* Buckl.

Elymus mackenzii Bush, Amer. Midl. Nat. 10: 53. 1926. Eagle Rock, Mo., *Bush* 77.

Clinelymus glaucus Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 648. 1932. Based on *Elymus glaucus* Buckl.

Clinelymus glaucus subsp. *californicus* Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 649. 1932. California, *Heller* 5714-a, first of several cited from California.

Clinelymus glaucus subsp. *coloratus* Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 648. 1932. Washington, *Heller* 3965.

ELYMUS GLAUCUS var. JEPSONI Davy, in Jepson, Fl. West. Mid. Calif. 79. 1901. Napa Valley, Calif., *Jepson.*

Elymus divergens Davy, in Jepson, Fl. West. Mid. Calif. 80. 1901. Petaluma, Calif., *Davy* 4037.

Elymus velutinus Scribn. and Merr., Bull. Torrey Bot. Club 29: 466. 1902. San Bernardino Mountains, Calif., *Abrams* 2056.

Elymus parishii Davy and Merr., Univ. Calif. Pubs., Bot. 1: 58. 1902. San Jacinto Mountains, Calif., *Hall* 2097.

Elymus edentatus Suksdorf, Werdenda 1^2: 4. 1923. Bingen, Wash., *Suksdorf* 10057.

Clinelymus glaucus subsp. *californicus* var. *pubescens* Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 649. 1932. California, *Tiling* 8822; *Palmer* 417.

Clinelymus velutinus Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 649. 1932. Based on *Elymus velutinus* Scribn. and Merr.

ELYMUS GLAUCUS var. TENUIS Vasey (Contrib. U.S. Natl. Herb. 1: 280. 1893). "Type specimen collected by John Macoun on Vancouver Island in 1887 (no. 3)" comprises two forms, all Macoun's no. 3. One specimen is a small form of *E. glaucus* var. *jepsoni;* the others have spikes with fragile rachises, spikelets with 5- to 6-nerved glumes and lemmas with divergent awns and apparently represent a form not found in the United States. There is another Macoun specimen upon which Vasey has written the varietal name *tenuis,* this specimen having glabrous sheaths and divergent awns. The description states that the sheaths are glabrous or pubescent and that the awns are divergent. Hence the plant of number 3 with divergent awns is selected as the type of *E. glaucus* var. *tenuis* and the name is excluded from our flora.

(14) **Elymus hirsutus** Presl, Rel. Haenk. 1: 264. 1830. Nootka Sound, Vancouver Island, *Haenke.*

Elymus ciliatus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 57. pl. 16. 1898. Not *E. ciliatus* Muhl., 1817. Sitka, Alaska, *Evans* 210.

Elymus borealis Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 27: 9. 1900. Based on *E. ciliatus* Scribn.

Clinelymus borealis Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 645. 1932. Based on *Elymus borealis* Scribn.

(7) **Elymus hirtiflorus** Hitchc., Amer. Jour. Bot. 21: 132. f. 2. 1934. Green River, Wyo., *Shear* 284.

(6) **Elymus innovatus** Beal, Grasses N.Amer. 2: 650. 1896. North Fork Sims River, Mont., *Williams* in 1887.

Elymus mollis R. Br., in Richards., Bot. App. Franklin Jour. 732. 1823. Not *E. mollis* Trin., 1821. Canada [*Richardson*].

Elymus brownii Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 8: 7. pl. 4. 1897. Banff, Alberta, *Canby* 24 in 1895.

(18) **Elymus interruptus** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1863. Llano County, Tex., *Buckley.*

Elymus occidentalis Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 13: 49. 1898. Laramie River, Wyo., *Nelson* 4470.

Elymus pringlei Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 24: 30. 1901. Hidalgo, Mexico, *Pringle* 6637.
Elymus diversiglumis Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 48. f. 22. 1901. Bear Lodge Mountains, Wyo., *Williams* 2653.
Terrellia diversiglumis Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus diversiglumis* Scribn. and Ball.

(15) **Elymus macounii** Vasey, Bull. Torrey Bot. Club 13: 119. 1886. Great Plains of British Columbia, *Macoun.*
Terrellia macounii Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus macounii* Vasey.

(2) **Elymus mollis** Trin., in Spreng., Neu. Entd. 2: 72. 1821. Kamchatka and the Aleutian Islands.
Elymus dives Presl, Rel. Haenk. 1: 265. 1830. Nootka Sound, Vancouver Island, *Haenke.*
Elymus arenarius var. *villosus* E. Meyer, Pl. Labrad. 20. 1830. Labrador.
Elymus ampliculmis Provancher, Fl. Canad. 2: 706. 1862. Canada.
Elymus capitatus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 55. pl. 14. 1898. Homer, Alaska, *Evans* 471. Abnormal form.
Elymus mollis brevispicus Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 11: 56. 1898. St. Lawrence Bay, Siberia.
Elymus villosissimus Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 326. f. 622. 1899. St. Paul Island, *Macoun* 16226.
Elymus arenarius forma *compositus* Abromeit, Bibl. Bot. 8: heft 42: 96. 1899. Greenland.
Elymus arenarius var. *mollis* Koidzumi, Jour. Coll. Sci. Univ. Tokyo 27: 24. 1910. Based on *E. mollis* Trin.
Elymus arenarius var. *compositus* St. John, Rhodora 17: 102. 1915. Based on *E. arenarius* forma *compositus* Abromeit.

(20) **Elymus riparius** Wiegand, Rhodora 20: 84. 1918. Ithaca, N.Y., *Eames* and *MacDaniels* 3567.

(10) **Elymus salina** Jones, Calif. Acad. Sci. Proc. II. 5: 725. 1895. Salina Pass, Utah, *Jones* 5447.

(8) **Elymus triticoides** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 99. 1863. "Rocky Mountains", *Nuttall.*
Elymus condensatus var. *triticoides* Thurb., in S. Wats., Bot. Calif. 2: 326. 1880. Based on *E. triticoides* Buckl.
Elymus orcuttianus Vasey, Bot. Gaz. 10: 258. 1885. San Diego, Calif., *Orcutt.*
Elymus simplex var. *luxurians* Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Bull. 11: 58. 1898. Green River, Wyo., *Williams* 2338.
Elymus acicularis Suksdorf, Werdenda 1²: 3. 1923. Bingen, Wash., *Suksdorf* 7861.

Elymus triticoides var. pubescens Hitchc., in Jepson, Fl. Calif. 1: 186. 1912. Griffin, Calif., *Elmer* 3748.

Elymus triticoides var. simplex (Scribn.) Hitchc., Amer. Jour. Bot. 21: 132. 1934. Based on *E. simplex* Scribn. and Williams.
Elymus simplex Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Bull. 11: 57. pl. 17. 1898. Green River, Wyo., *Williams* 2334.

(3) **Elymus vancouverensis** Vasey, Bull. Torrey Bot. Club 15: 48. 1888. Vancouver Island, *Macoun* in 1887.

(17) **Elymus villosus** Muhl.; Willd., Enum. Pl. 1: 131. 1809. Pennsylvania, *Muhlenberg.*
Elymus ciliatus Muhl., Descr. Gram. 179. 1817. North Carolina.
Elymus hirsutus Schreb.; Roem. and Schult., Syst. Veg. 2: 776. 1817, as synonym of *E. villosus* Muhl.
Elymus striatus var. *villosus* A. Gray, Man. 603. 1848. Based on *E. villosus* Muhl.
Elymus propinquus Fresen.; Steud., Syn. Pl. Glum 1: 349. 1854. Illinois.
Elymus arkansanus Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 45. f. 19. 1901. Arkansas, *Harvey.*
Elymus striatus var. *ballii* Pammel, Sup. Rept. Iowa Geol. Survey 1903: 347. f. 246. 1905. Iowa [type, from which figure was drawn, Johnson County, *Fitzpatrick*].
Elymus striatus var. *arkansanus* Hitchc., Rhodora 8: 212. 1906. Based on *E. arkansanus* Scribn. and Ball.
Hordeum villosum Schenck, Bot. Jahrb. Engler 40: 109. 1907. Based on *Elymus villosus* Muhl.

Elymus villosus forma *arkansanus* Fernald, Rhodora 35: 195. 1933. Based on *E. arkansanus* Scribn. and Ball.

(13) **Elymus virescens** Piper, Erythea 7: 101. 1899. Olympic Mountains, Wash., *Piper* 1988.

Elymus pubescens Davy, in Jepson, Fl. West. Mid. Calif. 78. 1901. Point Reyes, Calif.

Elymus howellii Scribn. and Merr., Contrib. U.S. Natl. Herb. 13: 88. 1910. Revillagigedo Island, British Columbia, *Howell* 1723.

Elymus strigatus St. John, Rhodora 17: 102. 1915. Westport, Mendocino County, Calif., *Congdon* in 1902.

(21) **Elymus virginicus** L., Sp. Pl. 84. 1753. Virginia.

Elymus carolinianus Walt., Fl. Carol. 82. 1788. South Carolina.

Hordeum cartilagineum Moench, Meth. 199. 1794. Grown in botanic garden, Marburg, Germany.

Elymus striatus Willd., Sp. Pl. 1: 470. 1797. North America.

Elymus hordeiformis Desf., Tabl. Ecol. Bot. Mus. 15. 1804, name only; Cat. Pl. Paris. ed. 3. 18, 387. 1829. Grown in botanical garden, Paris. "*E. striatus* Willd." cited as synonym.

Elymus durus Hedw.; Steud., Nom. Bot. ed. 2. 1: 550. 1840, as synonym of *E. virginicus* L.

Elymus virginicus var. *minor* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 550. 1892. Northern Texas, [*Buckley*].

Elymus virginicus forma *jejunus* Ramaley, Minn. Bot. Stud. 9: 114. 1894. Lake Benton, Minn., *Sheldon* 1735 (error for 1375).

Hordeum virginicum Schenck, Bot. Jahrb. Engler 40: 109. 1907. Based on *Elymus virginicus* L.

Hordeum striatum Schenck, Bot. Jahrb. Engler 40: 109. 1907. Based on *Elymus striatus* Willd.

Elymus jejunus Rydb., Bull. Torrey Bot. Club 36: 539. 1909. Based on *E. virginicus* forma *jejunus* Ramaley.

Terrellia virginica Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus virginicus* L.

Terrellia striata Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus striatus* Willd.

Elymus virginicus var. *jejunus* Bush, Amer. Midl. Nat. 10: 65. 1926. Based on *E. virginicus* forma *jejunus* Ramaley.

Terrella jejuna Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 639. 1932. Based on *Elymus virginicus* forma *jejunus* Ramaley.

Terrella virginica Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 639. 1932. *Based on Elymus virginicus* L.

Elymus virginicus var. australis (Scribn. and Ball) Hitchc., in Deam, Ind. Dept. Conserv. Pub. 82: 113. 1929. Based on *E. australis* Scribn. and Ball.

Elymus australis Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 46. f. 20. 1901. Biltmore, N.C., *Biltmore Herbarium* 411b.

Elymus virginicus var. *glabriflorus* forma *australis* Fernald, Rhodora 35: 198. 1933. Based on *E. australis* Scribn. and Ball.

Elymus virginicus var. glabriflorus (Vasey) Bush, Amer. Midl. Nat. 10: 62. 1926. Based on *E. canadensis* var. *glabriflorus* Vasey.

Elymus canadensis var. *glabriflorus* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 550. 1894. Texas to Georgia [Louisiana, *Langlois*].

?*Elymus virginicus* var. *glaucus* Beal, Grasses N.Amer. 2: 653. 1896. Agricultural College, Michigan, *Beal* 164, 165.

Elymus glabriflorus Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 49. f. 23. 1901. Based on *E. canadensis* var. *glabriflorus* Vasey.

Elymus australis var. *glabriflorus* Wiegand, Rhodora 20: 84. 1918. Based on *E. canadensis* var. *glabriflorus* Vasey.

Elymus virginicus var. halophilus (Bicknell) Wiegand, Rhodora 20: 83. 1918. Based on *E. halophilus* Bicknell.

Elymus halophilus Bicknell, Bull. Torrey Bot. Club 35: 201. 1908. Nantucket Island, Mass., *Bicknell*.

Terrella halophila Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 639. 1932. Based on *Elymus halophilus* Bicknell.

Elymus virginicus var. *halophilus* forma *lasiolepis* Fernald, Rhodora 35: 198. 1933. Nova Scotia, *Fernald, Long,* and *Linder* 20113.

Elymus virginicus var. intermedius (Vasey) Bush, Amer. Midl. Nat. 10: 60. 1926. Based on *E. canadensis* var. *intermedius* Vasey.

Elymus canadensis var. *intermedius* Vasey; A. Gray, Man. ed. 6. 673. 1890. Northeastern United States. [Type, Lansingburg, N.Y., *Howe* in 1886.]
Elymus intermedius Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 38. 1897. Not *E. intermedius* Bieb., 1808. Maine to Virginia, west to Illinois and Nebraska. [Herbarium evidence shows this to be based on *E. canadensis* var. *intermedius* Vasey.]
Elymus hirsutiglumis Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 58. 1898. Based on *E. intermedius* Scribn. and Smith.
Elymus virginicus var. *hirsutiglumis* Hitchc., Rhodora 10: 65. 1908. Based on *E. hirsutiglumis* Scribn.
Terrella hirsutiglumis Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 639. 1932. Based on *Elymus hirsutiglumis* Scribn.
Elymus virginicus var. *typicus* forma *hirsutiglumis* Fernald, Rhodora 35: 198. 1933. Based on *E. hirsutiglumis* Scribn.
ELYMUS VIRGINICUS var. SUBMUTICUS Hook., Fl. Bor. Amer. 2: 255. 1840. Cumberland House Fort, Saskatchewan, *Drummond.*
?*Elymus virginicus* var. *arcuatus* Wood, Amer. Bot. and Flor. pt. 2: 405. 1870. Southern States.
Elymus curvatus Piper, Bull. Torrey Bot. Club 30: 233. 1903. Stevens County, Wash., *Kreager* 375.
Elymus submuticus Smyth, Kans. Acad. Sci. Trans. 25: 99. 1913. Based on *E. virginicus* var. *submuticus* Hook.
Terrellia virginica var. *submutica* Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Elymus virginicus* var. *submuticus* Hook.
Terrella curvata Nevski, Bull. Jard. Bot. Acad. Sci. U.R.S.S. 30: 639. 1932. Based on *Elymus curvatus* Piper.

(152) ELYONURUS Humb. and Bonpl.

(1) **Elyonurus barbiculmis** Hack., in DC., Monogr. Phan. 6: 339. 1889. Texas, *Wright* 804; New Mexico, *Wright* 2106; Arizona, *Lemmon* 2926 [type]; *Rothrock* 638.
Elyonurus barbiculmis parviflorus Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 32: 1. 1901. Arizona, *Griffiths* 1849.
(2) **Elyonurus tripsacoides** Humb. and Bonpl.; Willd., Sp. Pl. 4: 941. 1806. Caracas, Venezuela, *Humboldt* and *Bonpland.*
Rottboellia ciliata Nutt., Gen. Pl. 1: 83. 1818. Georgia, *Baldwin.*
Anatherum tripsacoides Spreng., Syst. Veg. 1: 290. 1825. Based on *Elyonurus tripsacoides* Humb. and Bonpl.
Andropogon tripsacoides Steud., Syn. Pl. Glum. 1: 364. 1854. Based on *Elyonurus tripsacoides* Humb. and Bonpl.
Andropogon nuttallii Chapm., Fl. South. U.S. 580. 1860. Based on *Rottboellia ciliata* Nutt.
Elyonurus nuttallianus Benth.; Vasey, Grasses U.S. 17. 1883. Based on *Andropogon nuttallianus* [error for *nuttallii* Chapm.].
Elyonurus nuttallii Vasey, Descr. Cat. Grasses U.S. 25. 1885. Based on *Andropogon nuttallii* Chapm.

(12) ERAGROSTIS Host

Eragrostis abyssinica (Jacq.) Link, Hort. Berol. 1: 192. 1827. Based on *Poa abyssinica* Jacq. (The name is published as "*Eragrostis abessinica.*")
Poa abyssinica Jacq., Misc. Austr. 2: 364. 1781. [Abyssinia.]
(43) **Eragrostis acuta** Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Punta Rassa, Fla., *Hitchcock* 263.
Eragrostis alba Presl, Rel. Haenk. 1: 279. 1830. "Hab. ad Monte-Rey, Californiae. ♃" The label with the type specimen bears "Regio montana", indicating that the plant came from Peru. The species is not known from the United States.
(8) **Eragrostis amabilis** (L.) Wight and Arn.; Hook and Arn., Bot. Beechey Voy. 251. 1841. Based on *Poa amabilis* L.
Poa amabilis L., Sp. Pl. 68. 1753. India.
Poa plumosa Retz., Obs. Bot. 4: 20. 1786. East Indies.
Megastachya amabilis Beauv., Ess. Agrost. 74, 167, 173. 1812. Based on *Poa amabilis* L.
Cynodon amabilis Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Megastachya amabilis* Beauv.
Eragrostis plumosa Link, Hort. Berol. 1: 192. 1827. Based on *Poa plumosa* Retz.

Erochloë amabilis Raf.; Jacks., Ind. Kew. 2: 886. 1893, as synonym of *Eragrostis Poa amabilis* L.

Erochloë spectabilis Raf.; Jacks., Ind. Kew. 2: 886. 1893, as synonym of *Eragrostis amabilis.*

Eragrostis ciliaris var. *patens* Chapm.; Beal, Grasses N.Amer. 2: 479. 1896. Jesup, Ga., *Curtiss* 3493*.

Eragrostis tenella var. *plumosa* Stapf, in Hook. f., Fl. Brit. Ind. 7: 315. 1896. Based on *Poa plumosa* Retz.

Eragrostis amabilis var. *plumosa* E. G. and A. Camus in Lecomte, Fl. Gen. Ind.-Chin. 7: 557. 1923. Based on *Poa plumosa* Retz.

(29) **Eragrostis arida** Hitchc., Jour. Wash. Acad. Sci. 23: 449. 1933. Del Rio, Tex., *Hitchcock* 13650.

(46) **Eragrostis bahiensis** Schrad.; Schult., Mant. 2: 318. 1824. Brazil.

(25) **Eragrostis barrelieri** Daveau, in Morot., Jour. Bot. 8: 289. 1894. Southern Europe.

(5) **Eragrostis beyrichii** J. G. Smith, Rept. Mo. Bot. Gard. 6: 117. pl. 56. 1895. "Arkansas", Beyrich in 1834, but there is no recent record from that State. In 1834 the boundaries were as at present, but earlier included parts of Texas.

(14) **Eragrostis capillaris** (L.) Nees, Agrost. Bras. 505. 1829. Based on *Poa capillaris* L.

Poa capillaris L., Sp. Pl. 68. 1753. Canada, *Kalm.*

Poa tenuis Ell., Bot. S.C. and Ga. 1: 156. 1816. South Carolina.

Eragrostis tenuis Steud., Syn. Pl. Glum. 1: 273. 1854. Based on *Poa tenuis* Ell.

(45) **Eragrostis chariis** (Schult.) Hitchc., Lingnan Sci. Jour. 7: 193. 1931. Based on *Poa chariis* Schult.

Poa elegans Roxb., Hort. Beng. 82; Fl. Ind. 1: 339. 1820. Not *P. elegans* Poir., 1804. India.

Poa chariis Schult., Mant. 2: 314. 1824. Based on *P. elegans* Roxb.

Poa elegantula Kunth, Rév. Gram. 1: 114. 1829. Based on *P. elegans* Roxb.

Eragrostis elegantula Nees; Steud., Syn. Pl. Glum. 1: 266. 1854. Not *E. elegantula* Nees, 1851. Based on *Poa elegantula* Kunth.

Eragrostis chloromelas Steud., Syn. Pl. Glum. 1: 271. 1854. Based on the species described under *E. atrovirens* by Nees, that name based on *Poa atrovirens* Desf., a different species.

(23) **Eragrostis cilianensis** (All.) Link; Vign. Lut., Malpighia 18: 386. 1904. Based on *Poa cilianensis* All.

Briza eragrostis L., Sp. Pl. 70. 1753. Europe.

Poa cilianensis All., Fl. Pedem. 2: 246. 1785. Italy.

?*Briza caroliniana* Walt., Fl. Carol. 79. 1788. Not *B. caroliniana* Lam. South Carolina.

Poa megastachya Koel., Descr. Gram. 181. 1802. Based on *Briza eragrostis* L.

Eragrostis major Host, Icon. Gram. Austr. 4: 14. pl. 24. 1809; Fl. Austr. 1: 135. 1827. Austria.

Briza purpurascens Muhl., Descr. Gram. 154. 1817. Carolina.

Poa obtusa Nutt., Gen. Pl. 1: 67. 1818. Not *P. obtusa* Muhl., 1817. Philadelphia, *Barton.*

Poa pennsylvanica Nutt., Gen. Pl. 2: errata. 1818. Based on *P. obtusa* Nutt.

Poa philadelphica Barton, Compend. Fl. Phila. 1: 62. 1818. Based on *P. obtusa* Nutt.

Megastachya obtusa Schult., Mant. 2: 326. 1824. Based on *Poa obtusa* Nutt.

Megastachya purpurascens Schult., Mant. 2: 326. 1824. Based on *Briza purpurascens* Muhl.

Poa nuttallii Spreng., Syst. Veg. 1: 344. 1825. Based on *P. obtusa* Nutt.

Calotheca purpurascens Spreng., Syst. Veg. 1: 348. 1825. Based on *Briza purpurascens* Muhl.

Eragrostis megastachya Link, Hort. Berol. 1: 187. 1827. Based on *Poa megastachya* Koel.

Briza megastachya Steud., Nom. Bot. ed. 2. 1: 225. 1840, as synonym of *Poa megastachya.*

Eragrostis vulgaris var. *megastachya* Coss. and Germ., Fl. Env. Paris 2: 641. 1845. Based on *Poa megastachya* Koel.

Eragrostis poaeoides var. *megastachya* A. Gray, Man. ed. 2. 563. 1856. Based on *E. megastachya* Link.

Eragrostis virletii Fourn., Mex. Pl. 2: 116. 1886. San Luis Potosí, Mexico, *Virlet* 1391.

Eragrostis eragrostis MacM., Met. Minn. Vall. 75. 1892. Not *E. eragrostis* Beauv., 1812. Based on *Briza eragrostis* L.
Megastachya eragrostis Beauv.; Jacks., Ind. Kew. 3: 186. 1894, as synonym of *Eragrostis major* Host.
Eragrostis megastachya var. *cilianensis* Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 371. 1900. Based on *Poa cilianensis* All.
Eragrostis minor var. *megastachya* Davy, in Jepson, Fl. West Mid. Calif. 60. 1901. Based on *E. megastachya* Link.
Eragrostis cragrostis var. *megastachya* Farwell, Mich. Acad. Sci. Rept. 17: 182. 1916. Based on *Poa megastachya* Koel.
?*Eragrostis eragrostis* subvar. *leersioides* Farwell, Amer. Midl. Nat. 10: 306. 1927. Based on *E. multiflora* var. *leersioides* Richt., this based on *Megastachya leersioides* Presl described from Sicily, the description not applying to American forms.

(7) **Eragrostis ciliaris** (L.) R. Br., in Tuckey, Narr. Exp. Congo App. 478. 1818. Based on *Poa ciliaris* L.
Poa ciliaris L., Syst. Nat. ed. 10. 2: 875. 1759. Jamaica.
Megastachya ciliaris Beauv., Ess. Agrost. 74, 167, 174, 1812. Based on *Poa ciliaris* L.
Eragrostis villosa Trin., Fund. Agrost. 137. 1820. Based on *Poa ciliaris* L.
Cynodon ciliaris Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Megastachya ciliaris* Beauv.
Macroblepharus contractus Phil., Linnaea 19: 101. 1858. Chile, *Gay* 129.
Eragrostis ciliaris var. *laxa* Kuntze, Rev. Gen. Pl. 2: 774. 1891. West Indies.
Erosion ciliare Lunell, Amer. Midl. Nat. 4: 221. 1915. Based on *Eragrostis ciliaris* Link.

(3) **Eragrostis curtipedicellata** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 97. 1863. Northern Texas, *Buckley.*
Eragrostis brevipedicellata A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863, as synonym of *E. curtipedicellata* Buckl.
Eragrostis viscosa Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 51. pl. 7. 1898. Not *E. viscosa* Trin., 1830. Midland, Tex., *J. G. Smith.*

Eragrostis curvula (Schrad.) Nees, Fl. Afr. Austr. 397. 1841. Based on *Poa curvula* Schrad.
Poa curvula Schrad., Gött. Anz. Ges. Wiss. 3: 2073. 1821. Cape Good Hope.

Eragrostis cyperoides (Thunb.) Beauv., Ess. Agrost. 71, 162, 174. 1812. Based on *Poa cyperoides* Thunb.
Poa cyperoides Thunb., Prodr. Pl. Cap. 22. 1794. South Africa.

(18) **Eragrostis diffusa** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 97. 1863. Northern Texas, *Buckley.*
Eragrostis purshii var. *delicatula* Munro; Scribn., Bull. Torrey Bot. Club 10: 30. 1883. Name only. Arizona, *Pringle.*
Eragrostis purshii var. *diffusa* Vasey, Contrib. U.S. Natl. Herb. 1: 59. 1890. Based on *E. diffusa* Buckl.

(42) **Eragrostis elliottii** S. Wats., Amer. Acad. Sci. Proc. 25: 140. 1890. Based on *Poa nitida* Ell.
Poa nitida Ell., Bot. S.C. and Ga. 1: 162. 1816. Not *P. nitida* Lam., 1791. South Carolina.
Eragrostis nitida Chapm., Fl. South. U.S. 564. 1860. Not *E. nitida* Link, 1827. Based on *Poa nitida* Ell.
Eragrostis macropoda Pilger, in Urban, Symb. Antill. 4: 106. 1903. Puerto Rico, *Sintenis* 1233.

(33) **Eragrostis erosa** Scribn.; Beal, Grasses N.Amer. 2: 483. 1896. Chihuahua, Mexico, *Pringle* 415.

(15) **Eragrostis frankii** C. Meyer; Steud., Syn. Pl. Glum. 1: 273. 1854. Ohio, *Frank.*
Poa parviflora Nutt., Gen. Pl. 1: 67. 1818. Not *P. parviflora* R. Br. [United States].
Poa micrantha Schult., Mant. 2: 305. 1824. Not *Eragrostis micrantha* Hack., 1895. Based on *P. parviflora* Nutt.
Eragrostis erythrogona Nees; Steud., Syn. Pl. Glum. 1: 273. 1854. St. Louis, *Drummond.*
Eragrostis capillaris var. *frankii* Farwell, Mich. Acad. Sci. Rept. 17: 182. 1916. Based on *E. frankii* "Steud."
ERAGROSTIS FRANKII var. BREVIPES Fassett, Rhodora 34: 95. 1932. Glenhaven Wis., *Fassett* 12899.

(9) **Eragrostis glomerata** (Walt.) L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 543. 1894. Based on *Poa glomerata* Walt.

Poa glomerata Walt., Fl. Carol. 80. 1788. South Carolina.

Poa conferta Ell., Bot. S.C. and Ga. 1: 158. 1816. South Carolina.

Megastachya glomerata Schult., Mant. 2: 327. 1824. Based on *Poa glomerata* Walt.

Poa walteri Kunth, Rév. Gram. 1: 116. 1829. Based on *P. glomerata* Walt.

Eragrostis conferta Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 409. 1830. Based on *Poa conferta* Ell.

Eragrostis pallida Vasey, Contrib. U.S. Natl. Herb. 1: 285. 1893. Colima, Mexico, *Palmer* 1268.

(30) **Eragrostis hirsuta** (Michx.) Nees, Agrost. Bras. 508. 1829. Based on *Poa hirsuta* Michx.

?*Poa simplex* Walt., Fl. Carol. 79. 1788. Not *Eragrostis simplex* Scribn. South Carolina.

Poa hirsuta Michx., Fl. Bor. Amer. 1: 68. 1803. South Carolina, *Michaux.*

Eragrostis sporoboloides Smith and Bush, Rept. Mo. Bot. Gard. 6: 116. pl. 54. 1895. Sapulpa, Indian Territory [Okla.], *Bush* [766].

(11) **Eragrostis hypnoides** (Lam.) B.S.P., Prel. Cat. N.Y. 69. 1888. Based on *Poa hypnoides* Lam.

Poa hypnoides Lam., Tabl. Encycl. 1: 185. 1791. Tropical America.

Megastachya hypnoides Beauv., Ess. Agrost. 74, 167, 175. 1812. Based on *Poa hypnoides* Lam.

Poa reptans var. *caespitosa* Torr., Fl. North. and Mid. U. S. 1:115. 1823. New Jersey.

Neeragrostis hypnoides Bush, St. Louis Acad. Sci. Trans. 13: 180. 1903. Based on *Poa hypnoides* Lam.

Erosion hypnoides Lunell, Amer. Midl. Nat. 4: 221. 1915. Based on *Poa hypnoides* Lam.

(35) **Eragrostis intermedia** Hitchc., Jour. Wash. Acad. Sci. 23: 450. 1933. San Antonio, Tex., *Hitchcock* 5491.

(31) **Eragrostis lugens** Nees, Agrost. Bras. 505. 1829. Brazil.

Poa lugens Kunth, Rév. Gram. 1: Sup. XXVIII. 1830. Based on *Eragrostis lugens* Nees.

(22) **Eragrostis lutescens** Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 7. 1899. Almota, Wash., *Piper* 2624.

(27) **Eragrostis mexicana** (Hornem.) Link, Hort. Berol. 1: 190. 1827. Based on "*Poa mexicana* Lag. Hornem."

Poa mexicana Hornem., Hort. Hafn. 2: 953. 1815. Garden specimen from Mexican seed.

Poa mexicana Lag., Gen. and Sp. Nov. 3. 1816. Grown in Madrid from Mexican seed.

Small specimens of this species have been referred to *Eragrostis limbata* Fourn., a Mexican species, not known from the United States.

(26) **Eragrostis neo-mexicana** Vasey, Contrib. U.S. Natl. Herb. 2: 542. 1894. New Mexico, *Vasey.*

Eragrostis obtusa Munro; Stapf, in Dyer, Fl. Cap. 7: 625. 1898. South Africa.

(1) **Eragrostis obtusiflora** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 8: 10. pl. 5. 1897. Laguna de Santa Maria, Mexican side of boundary, *Wright* 193, and Sulphur Springs Valley, Ariz., *Toumey.* Scribner doubtfully cites "*Brizopyrum obtusiflorum* Fourn.?" The description of that is inadequate for identification.

(21) **Eragrostis orcuttiana** Vasey, Contrib. U.S. Natl. Herb. 1: 269. 1893. San Diego, Calif., *Orcutt* 1313.

(34) **Eragrostis palmeri** S. Wats., Amer. Acad. Sci. Proc. 18: 182. 1883. Juarez, Coahuila, *Palmer* 1368.

(17) **Eragrostis pectinacea** (Michx.) Nees, Fl. Afr. Austr. 406. 1841. Based on *Poa pectinacea* Michx., the name given as "*Er. pectinacea* Michx."

Poa pectinacea Michx., Fl. Bor. Amer. 1: 69. 1803. Illinois, *Michaux.*

Poa caroliniana Spreng., Mant. Fl. Hal. 33. 1807. North Carolina.

Poa eragrostis Ell., Bot. S.C. and Ga. 1: 161. 1816. Not *P. eragrostis* L., 1753. South Carolina and Georgia.

Poa tenella Nutt., Gen. Pl. 1: 67. 1818. Not *P. tenella* L., 1753. North America.

Poa capillaris Link, Enum. Hort. Berol. 1: 88. 1821. Not *P. capillaris* L., 1753. Based on *P. caroliniana* Spreng.

Eragrostis brizoides Schult., Mant. 2: 319. 1824. Based on *Poa tenella* Nutt.

Poa nuttallii Kunth, Rév. Gram. 1: 116. 1829. Not *P. nuttallii* Spreng., 1825. Based on *Poa tenella* Nutt.

Eragrostis purshii Schrad., Linnaea 12: 451. 1838. North America; description inadequate; Gray, Man. ed. 2. 564. 1856.

Poa diandra Schrad., Linnaea 12: 451. 1838, as synonym of *Eragrostis purshii* Schrad.

Eragrostis nuttalliana Steud., Nom. Bot. ed. 2. 1: 563. 1840. Based on *Poa tenella* Nutt.

?*Eragrostis pennsylvanica* Scheele, Flora 27: 58. 1844. Pennsylvania.

?*Eragrostis unionis* Steud., Syn. Pl. Glum. 1: 273. 1854. Miami, Ohio.

?*Eragrostis cognata* Steud., Syn. Pl. Glum. 1: 273. 1854. Ohio.

Eragrostis caroliniana Scribn., Mem. Torrey Bot. Club 5: 49. 1894. Based on *Poa caroliniana* Spreng.

Eragrostis pilosa var. *caroliniana* Farwell, Mich. Acad. Sci. Rept. 17: 182. 1916. Based on *Poa caroliniana* Spreng.

(20) **Eragrostis peregrina** Wiegand, Rhodora 19: 95. 1917. Based on *E. pilosa* var. *condensata* Hack.

Eragrostis pilosa var. *damiensiana* Bonnet, Naturaliste 3: 412. 1881. France.

Eragrostis pilosa var. *condensata* Hack., Allg. Bot. Ztschr. 7: 13. 1901. Karlsruhe, Germany, *Kneucker* Gram. Exs. 115.

Eragrostis damiensiana Thell., Repert. Sp. Nov. Fedde 24: 323. 1928. Based on *E. pilosa* var. *damiensiana* Bonnet.

Eragrostis damiensiana var. *condensata* Thell., Repert. Sp. Nov. Fedde 24: 328. 1928. Based on *E. pilosa* var. *condensata* Hack.

(40) **Eragrostis pilifera** Scheele, Linnaea 22: 344. 1849. New Braunfels, Tex., *Lindheimer.*

Eragrostis grandiflora Smith and Bush, Rept. Mo. Bot. Gard. 6: 117. pl. 55. 1895. Sapulpa, Indian Territory [Okla.], *Bush* [808].

(16) **Eragrostis pilosa** (L.) Beauv., Ess. Agrost. 71, 162, 175. 1812. Based on *Poa pilosa* L.

Poa pilosa L., Sp. Pl. 68. 1753. Italy.

Poa eragrostis Walt., Fl. Carol. 80. 1788. Not *P. eragrostis* L., 1753. South Carolina.

?*Poa tenella* [L. misapplied by] Pursh, Fl. Amer. Sept. 1: 80. 1814. New Jersey to Carolina. Elliott (Bot. S.C. and Ga. 1: 160. 1816) follows Pursh. According to Merrill (U.S. Dept. Agr., Div. Agrost. Circ. 29: 11. 1901) Elliott's plant is *E. pilosa.*

Eragrostis filiformis Link, Hort. Berol. 1: 191. 1827. North America.

Poa linkii Kunth, Rév. Gram. 1: 113. 1829. Based on *Eragrostis filiformis* Link.

Eragrostis linkii Steud., Syn. Pl. Glum. 1: 273. 1854. Based on *Poa linkii* Kunth.

(24) **Eragrostis poaeoides** (L.) Beauv., Ess. Agrost. 162. 1812, name only; Roem. and Schult., Syst. Veg. 2: 574. 1817. Based on *Poa eragrostis* L.

Poa eragrostis L., Sp. Pl. 68. 1753. Italy.

Eragrostis minor Host, Icon. Gram. Austr. 4: 15. 1809 [name untenable because the genus was not validly published until 1812]; Fl. Austr. 1: 135. 1827. Based on *Poa eragrostis* L.

Eragrostis eragrostis Beauv., Ess. Agrost. 71, 174. pl. 14. f. 11. 1812. Based on *Poa eragrostis* L.

Eragrostis poaeformis Link, Hort. Berol. 1: 188. 1827. Based on *Poa eragrostis* L.

Eragrostis vulgaris var. *microstachya* Coss. and Germ., Fl. Env. Paris 2: 641. 1845. Based on *Poa eragrostis* L.

Eragrostis eragrostis var. *microstachya* Farwell, Amer. Midl. Natl. 10: 306. 1927. Based on *E. vulgaris* var. *microstachya* Coss. and Germ.

(44) **Eragrostis refracta** (Muhl.) Scribn., Mem. Torrey Bot. Club 5: 49. 1894. Based on *Poa refracta* Muhl.

?*Poa virginica* Zucc.; Roemer, Coll. Bot. 1: 124. 1809. Virginia.

Poa refracta Muhl.; Ell., Bot. S.C. and Ga. 1: 162. 1816. South Carolina.

Eragrostis campestris Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 72. 1836. North America.

Eragrostis longeradiata Steud., Syn. Pl. Glum. 1: 272. 1854. Carolina, *Curtis.*

?*Eragrostis virginica* Steud., Syn. Pl. Glum. 1: 273. 1854. Based on *Poa virginica* Zucc.

Eragrostis pectinacea var. *refracta* Chapm., Fl. South. U.S. 564. 1860. Based on *Poa refracta* Muhl.

Eragrostis campestris var. *refracta* Chapm., Fl. South. U.S. ed. 3. 617. 1897. Based on *Poa refracta* Muhl.

Poa reflexa Ell.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 5. 1900, as synonym of *Eragrostis refracta* Scribn.

This species was described under the name *Poa capillaris* L., in Michx., Fl. Bor. Amer. 1: 67. 1803.

(10) **Eragrostis reptans** (Michx.) Nees, Agrost. Bras. 514. 1829. Based on *Poa reptans* Michx.

Poa reptans Michx., Fl. Bor. Amer. 1: 69. pl. 11. 1803. Illinois, *Michaux.*

Poa dioica Michx.; Poir., in Lam., Encycl. 5: 87. 1804, erroneously cited as synonym of *P. hypnoides* Lam. Kaskaskia River, Ill., *Michaux.*

Megastachya reptans Beauv., Ess. Agrost. 74, 167, 175. 1812. Based on *Poa reptans* Michx.

Poa weigeltiana Reichenb.; Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 410. 1830, as synonym of *Eragrostis reptans* Nees. Dutch Guiana, *Weigelt.*

Poa dioica Vent.; Kunth, Enum. Pl. 1: 336. 1833, as synonym of *P. reptans* Michx.

Poa capitata Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 146. 1837. Arkansas River, *Nuttall.*

Eragrostis capitata Nash, in Britton, Man. 1042. 1901. Based on *Poa capitata* Nutt.

Neeragrostis weigeltiana Bush, St. Louis Acad. Sci. Trans. 13: 178. 1903. Based on *Poa weigeltiana* Reichenb.

Eragrostis weigeltiana Bush, St. Louis Acad. Sci. Trans. 13: 180. 1903. Based on *Poa weigeltiana* Reichenb.

(4) **Eragrostis secundiflora** Presl, Rel. Haenk. 1: 276. 1830. Mexico, *Haenke.*

Poa secundiflora Kunth, Rév. Gram. 1: Sup. XXVIII. 1830. Based on *Eragrostis secundiflora* Presl.

Poa interrupta Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 146. 1837. Not *P. interrupta* Lam., 1791. Banks of the Arkansas [*Nuttall*].

Poa oxylepis Torr., in Marcy, Expl. Red Riv. 301. 1853. Based on *Poa interrupta* Nutt.

Eragrostis oxylepis Torr., U.S. Rept. Expl. Miss. Pacif. 4: 156. 1857. Based on *Poa oxylepis* Torr.

Eragrostis veraecrucis Rupr., Bull. Acad. Sci. Brux. 9^2: 235. 1842, name only; Fourn., Mex. Pl. 2: 118. 1886, as synonym of *Megastachya oxylepis* var. *capitata* Fourn.

Megastachya oxylepis Fourn., Mex. Pl. 2: 118. 1886. Based on *Poa oxylepis* Torr.

Megastachya oxylepis var. *capitata* Fourn., Mex. Pl. 2: 118. 1886. Vera Cruz, Mexico.

Eragrostis interrupta Trel., in Branner and Coville, Ann. Rept. Geol. Survey Ark. 4: 237. 1891. Not *E. interrupta* Beauv., 1812. Based on *Poa interrupta* Nutt.

(2) **Eragrostis sessilispica** Buckl. Acad. Nat. Sci. Phila. Proc. 1862: 97. 1863. Austin, Tex., *Buckley.*

Diplachne rigida Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12^2: pl. 44. 1891. Texas [type, *Reverchon* in 1879], and New Mexico, northward to Kansas.

Leptochloa rigida Munro; Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12^2: pl. 44. 1891, as synonym of *Diplachne rigida* Vasey.

Eragrostis rigida Scribn., Acad. Nat. Sci. Phila. Proc. 1891: 304. 1891. Based on *Diplachne rigida* Vasey.

Acamptoclados sessilispicus Nash, in Small, Fl. Southeast. U.S. 140. 1903. Based on *Eragrostis sessilispica* Buckl.

(38) **Eragrostis silveana** Swallen, Amer. Jour. Bot. 19: 438. f. 3. 1932. Taft, Tex., *Silveus* 360.

(12) **Eragrostis simplex** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7 (ed. 3): 250. f. 244. 1900. Florida, *Curtiss* 6073.

Eragrostis brownei Kunth; Chapm., Fl. South. U.S. ed. 2. 664. 1883. Not *E. brownei* Nees, 1841. East Florida, *Garber.* (Chapman probably had *E. brownei* (Kunth) Nees, an Australian species, in mind, but he cites nothing that can connect his publication with that. The name *E. brownei* Nees is used for *E. simplex* by Scribner, U.S.Dept.Agr., Div. Agrost. Bull. 7: 262. 1897.)

(41) **Eragrostis spectabilis** (Pursh) Steud., Nom. Bot. ed. 2. 1: 564. 1840. Based on *Poa spectabilis* Pursh.

?*Poa amabilis* Walt., Fl. Carol. 80. 1788. Not *P. amabilis* L., 1753. South Carolina.
Poa spectabilis Pursh, Fl. Amer. Sept. 1: 81. 1814. New York to Carolina.
Megastachya spectabilis Roem. and Schult., Syst. Veg. 2: 589. 1817. Based on *Poa spectabilis* Pursh.
Poa hirsuta var. *spectabilis* Torr., Fl. North. and Mid. U.S. 1: 114. 1823. Based on *Poa spectabilis* Pursh.
?*Eragrostis velutina* Schrad., Linnaea 12: 451. 1838. Carolina.
?*Poa villosa* Beyr.; Schrad., Linnaea 12: 451. 1838, as synonym of *E. velutina* Schrad.
Eragrostis geyeri Steud., Syn. Pl. Glum 1: 272. 1854. Illinois, *Geyer.*
Poa pectinacea Geyer; Steud., Syn. Pl. Glum. 1: 272. 1854. Not *P. pectinacea* Michx., 1803. As synonym of *Eragrostis geyeri* Steud.
Eragrostis pectinacea var. *spectabilis* A. Gray, Man. ed. 2. 565. 1856. Based on *Poa spectabilis* Pursh.
Eragrostis spectabilis var. *sparsihirsuta* Farwell, Amer. Midl. Nat. 10: 306. 1927. Michigan.
This is the species called *Poa pectinacea* Michx. and *Eragrostis pectinacea* Nees by American authors, not Michaux's species.
(6) **Eragrostis spicata** Vasey, Bot. Gaz. 16: 146. 1891. Baja California, *Brandegee.*
Sporobolus tenuispica Hack., Repert. Sp. Nov. Fedde 6: 344. 1909. Pilcomayo River, Paraguay, *Rojas* 258.
Eragrostis stenophylla Hochst.; Miquel, An. Bot. Ind. 2: 27. 1851. Asia.
(28) **Eragrostis suaveolens** Becker, in Claus, Beitr. Pflanzenk. Russ. Reich. 8: 266. 1851. Serepta, Russia.
(36) **Eragrostis swalleni** Hitchc., Jour. Wash. Acad. Sci. 23: 451. 1933. Riviera, Tex., *Swallen* 1847.
Eragrostis tenella (L.) Beauv.; Roem. and Schult., Syst. Veg. 2: 576. 1817. Based on *Poa tenella* L.
Poa tenella L., Sp. Pl. 69. 1753. India.
Poa japonica Thunb., Fl. Japon. 51. 1784. Japan.
Eragrostis japonica Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 405. 1830. Based on *Poa japonica* Thunb.
(19) **Eragrostis tephrosanthos** Schult., Mant. 2: 316. 1824. Martinique, *Sieber.*
Poa tephrosanthos Spreng.; Schult., Mant. 2: 316. 1824, as synonym of *Eragrostis tephrosanthos* Schult.
Eragrostis delicatula Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 73. 1836. Brazil.
Eragrostis pilosa var. *delicatula* Hack.; Stuck., An. Mus. Nac. Buenos Aires 11: 133. 1904. Based on *E. delicatula* Trin.
(37) **Eragrostis tracyi** Hitchc., Amer. Jour. Bot. 21: 130. f. 1. 1934. Sanibel Island, Fla., *Tracy* 7168.
(32) **Eragrostis trichocolea** Arech., An. Mus. Nac. Montevideo 1: 444. 1896. Uruguay.
Eragrostis floridana Hitchc., Amer. Jour. Bot. 2: 308. 1915. Tampa, Fla., *Curtiss* 3494*.
(39) **Eragrostis trichodes** (Nutt.) Wood, Class-book 796. 1861. Based on *Poa trichodes* Nutt.
Poa trichodes Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 146. 1837. Arkansas, *Nuttall.*
Eragrostis tenuis var. *texensis* Vasey, Contrib. U.S. Natl. Herb. 1: 59. 1890. Texas, *Nealley.*
Eragrostis tenuis A. Gray, Man. ed. 6. 661. 1890. Not *E. tenuis* Steud., 1854. Ohio to Illinois, Kansas and southward.
Eragrostis capillacea Jedw., Bot. Archiv Mez 5: 196. 1924. Nebraska, *Rydberg* 1832.
(13) **Eragrostis unioloides** (Retz.) Nees; Steud., Syn. Pl. Glum. 1: 264. 1854. Based on *Poa unioloides* Retz.
Poa unioloides Retz., Obs. Bot. 5: 19. 1789. East Indies.
Eragrostis virescens Presl, Rel. Haenk. 1: 276. 1830. Chile, Haenke.
Eremochloa ciliaris (L.) Merr., Philippine Jour. Sci. 1 (Sup. 5): 331. 1906. Based on *Nardus ciliaris* L.
Nardus ciliaris L., Sp. Pl. 53. 1753. India.

Eremochloa ophiuroides (Munro) Hack., in DC., Monogr. Phan. 6: 261. 1889. Based on *Ischaemum ophiuroides* Munro.

Ischaemum ophiuroides Munro, Amer. Acad. Sci. Proc. 4: 363. 1860. Southern China.

(143) ERIANTHUS Michx.

(3) **Erianthus alopecuroides** (L.) Ell., Bot. S.C. and Ga. 1: 38. 1816. Based on *Andropogon alopecuroides* L.

Andropogon divaricatus L., Sp. Pl. 1045. 1753. Virginia, [*Clayton* 70].

Andropogon alopecuroides L., Sp. Pl. 1045. 1753. Virginia, [*Clayton* 601].

Saccharum alopecuroideum Nutt., Gen. Pl. 1: 60. 1818. Based inferentially on *Erianthus alopecuroides* Ell.

Erianthus divaricatus Hitchc., Contrib. U.S. Natl. Herb. 12: 125. 1908. Based on *Andropogon divaricatus* L.

ERIANTHUS ALOPECUROIDES var. HIRSUTUS Nash, in Small, Fl. Southeast. U.S. 55. 1903. Florida [*Chapman.*] (Published as *E. alopecuroides hirsutus.*)

(4) **Erianthus brevibarbis** Michx., Fl. Bor. Amer. 1: 55. 1803. Tennessee and Carolina, *Michaux.*

Saccharum brevibarbe Pers., Syn. Pl. 1: 103. 1805. Based on *Erianthus brevibarbis* Michx.

Calamagrostis rubra Bosc; Kunth, Enum. Pl. 1: 478. 1833, as synonym of *Erianthus brevibarbis* Michx.

Erianthus alopecuroides var. *brevibarbis* Chapm., Fl. South U.S. 583. 1860. Based on *E. brevibarbis* Michx.

Erianthus saccharoides subsp. *brevibarbis* Hack., in DC., Monogr. Phan. 6: 131. 1889. Based on *E. brevibarbis* Michx.

(2) **Erianthus contortus** Baldw.; Ell., Bot. S.C. and Ga. 1: 40. 1816. Savannah, Ga., *Baldwin.*

Saccharum contortum Nutt., Gen. Pl. 1: 60. 1818. Based on *Erianthus contortus* Ell.

Erianthus alopecuroides var. *contortus* Chapm., Fl. South. U.S. 582. 1860. Based on *E. contortus* Ell.

Erianthus saccharoides subsp. *contortus* Hack., in DC., Monogr. Phan. 6: 131. 1889. Based on *E. contortus* Ell.

Erianthus smallii Nash, Bull. N.Y. Bot. Gard. 1: 429. 1900. Stone Mountain, Ga., *Small* in 1894.

(5) **Erianthus giganteus** (Walt.) Muhl., Cat. Pl. 4. 1813. Based on *Anthoxanthum giganteum* Walt. Later (Descr. Gram. 192. 1817) Muhlenberg uses the name for both *E. saccharoides* and *E. alopecuroides* (his herbarium specimen under this name including both species), but the description (awn twisted) applies better to *E. alopecuroides. Erianthus giganteus* was published as new by Hubbard (Rhodora 14: 166. 1912) based on *Anthoxanthum giganteum* Walt.

Anthoxanthum giganteum Walt., Fl. Carol. 65. 1788. South Carolina.

Erianthus saccharoides Michx., Fl. Bor. Amer. 1: 55. 1803. Carolina to Florida, *Michaux.*

Saccharum giganteum Pers., Syn. Pl. 1: 103. 1805. Based on *Anthoxanthum giganteum* Walt.

Saccharum erianthoides Raspail, Ann. Sci. Nat., Bot. 5: 308. 1825. Based on *Erianthus saccharoides* Rich. [same as Michx.].

Andropogon erianthus Link, Hort. Berol. 1: 243. 1827. Based on *Erianthus saccharoides* Michx.

Erianthus saccharoides var. *michauxii* Hack., in Mart., Fl. Bras. 2^3: 257. 1883. Based on *E. saccharoides* Michx.

Erianthus compactus Nash, Bull. Torrey Bot. Club 22: 419. 1895. New Jersey to North Carolina and Tennessee [type, Washington, D.C., *Nash* in 1895].

Erianthus laxus Nash, Bull. Torrey Bot. Club 24: 344. 1897. Near Paola, Fla., *Swingle* 1432a.

Erianthus tracyi Nash, Bull. Torrey Bot. Club 24: 37. 1897. Starkville, Miss., *Tracy* in 1896.

Erianthus ravennae (L.) Beauv., Ess. Agrost. 14, 162, 177, 1812. Based on *Saccharum ravennae* L.

Andropogon ravennae L., Sp. Pl. ed. 2. 2: 1481. 1763. Italy.

Saccharum ravennae Murr., in L., Syst. Veg. ed. 13. 88. 1774. Based on *Andropogon ravennae* L.

Ripidium ravennae Trin., Fund. Agrost. 169. 1820. Based on *Saccharum ravennae* Murr.

(1) **Erianthus strictus** Baldw.; Ell., Bot. S.C. and Ga. 1: 39. 1816. Savannah, Ga., *Baldwin.*
Saccharum strictum Nutt., Gen. Pl. 1: 60. 1818. Based on *Erianthus strictus* Baldw.
Saccharum baldwinii Spreng., Syst. Veg. 1: 282. 1825. Based on *Erianthus strictus* Baldw.
Pollinia dura Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2[1]: 91. 1836. Carolina.
Andropogon durus Steud., Nom. Bot. ed. 2. 1: 91. 1840. Based on *Pollinia dura* Trin.

(124) ERIOCHLOA H.B.K.

(1) **Eriochloa aristata** Vasey, Bull. Torrey Bot. Club 13: 229. 1886. Southwest Chihuahua, *Palmer* in 1885 [110e].
Eriochloa punctata var. *aristata* Jones, Contrib. West. Bot. 14: 11. 1912. Based on *E. aristata* Vasey.
(6) **Eriochloa contracta** Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Helopus mollis* C. Muell.
Helopus mollis C. Muell., Bot. Ztg. 19: 314. 1861. Not *Eriochloa mollis* Kunth, 1829. Texas, *Drummond* 370.
(5) **Eriochloa gracilis** (Fourn.) Hitchc., Jour. Wash. Acad. Sci. 23: 455. 1933. Based on *Helopus gracilis* Fourn.
Helopus gracilis Fourn., Mex. Pl. 2: 13. 1886. Oaxaca, Mexico, *Liebmann* 436.
ERIOCHLOA GRACILIS var. MINOR (Vasey) Hitchc., Jour. Wash. Acad. Sci. 23: 456. 1933. Based on *E. punctata* var. *minor* Vasey.
Eriochloa punctata var. *minor* Vasey, Contrib. U.S. Natl. Herb. 3: 21. 1892. Texas, *Wright* 2087, *Nealley.*
Eriochloa texana Mez, Bot. Jahrb. Engler 56: Beibl. 125: 12. 1921. [El Paso] Tex., *Jones* 4177.
(3) **Eriochloa lemmoni** Vasey and Scribn., Bot. Gaz. 9: 185. pl. 2. 1884. [Huachuca Mountains], Ariz., *Lemmon* 2910.
(8) **Eriochloa michauxii** (Poir.) Hitchc., Contrib. U.S. Natl. Herb. 12: 147. 1908. Based on *Panicum michauxii* Poir.
Panicum molle Michx., Fl. Bor. Amer. 1: 47. 1803. Not *P. molle* Swartz, 1788. Florida, *Michaux.*
Panicum michauxii Poir., in Lam., Encycl. Sup. 4: 278. 1816. Based on *P. molle* Michx.
Panicum michauxianum Schult., Mant. 2: 227. 1824. Based on *P. molle* Michx.
Panicum georgicum Spreng., Syst. Veg. 1: 308. 1825. Based on *P. molle* Michx.
Eriochloa mollis Kunth, Rév. Gram. 1: 30. 1829. Based on *Panicum molle* Michx.
Eriochloa mollis var. *longifolia* Vasey, Bull. Torrey Bot. Club 13: 25. 1886. Key West, Fla., *Curtiss.*
Eriochloa longifolia Vasey, Contrib. U.S. Natl. Herb. 3: 21. 1892. Based on *E. mollis* var. *longifolia* Vasey.
Eriochloa debilis Mez, Bot. Jahrb. Engler 56: Beibl. 125: 12. 1921. [No-name Key], Fla., *Curtiss* 3600. The same form as *E. longifolia* Vasey.
ERIOCHLOA MICHAUXII var. SIMPSONI Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Cape Romano, Fla., *Simpson* 262. (Published as *E. michauxii simpsoni.*)
Eriochloa nelsoni Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 12. 1897. Oaxaca, Mexico, *Nelson* 1707.
(4) **Eriochloa procera** (Retz.) Hubbard, Kew Bull. Misc. Inf. 1930: 256. 1930. Based on *Agrostis procera* Retz.
Agrostis procera Retz., Obs. Bot. 4: 19. 1786. India.
Milium ramosum Retz., Obs. Bot. 6: 22. 1791. Asia.
Paspalum annulatum Flügge, Monogr. Pasp. 133. 1810. Asia.
Agrostis ramosa Poir., in Lam., Encycl. Sup. 1: 257. 1810. Based on *Milium ramosum* Retz.
Eriochloa annulata Kunth, Rév. Gram. 1: 30. 1829. Based on *Paspalum annulatum* Flügge.
Helopus annulatus Nees, Agrost. Bras. 17. 1829. Based on *Paspalum annulatum* Flügge.
Eriochloa ramosa Kuntze, Rev. Gen. Pl. 2: 775. 1891. Based on *Milium ramosum* Retz.

Eriochloa polystachya var. *annulata* Maid. and Betche, Cens. N.S. Wales Pl. 16. 1916. Based on *E. annulata* Kunth.
Thysanolaena procera Mez, in Janow., Bot. Archiv Mez 1: 27. 1922. Based on *Agrostis procera* Retz. but misapplied to *T. maxima*.
(7) **Eriochloa punctata** (L.) Desv.; Hamilt., Prodr. Pl. Ind. Occ. 5. 1825. Based on *Milium punctatum* L.
Milium punctatum L., Syst. Nat. ed. 10. 2: 872. 1759. Jamaica.
Agrostis punctata Lam., Encycl. 1: 58. 1783. Based on *Milium punctatum* L.
Paspalum punctatum Flügge, Monogr. Pasp. 127. 1810. Based on *Milium punctatum* L.
Piptatherum punctatum Beauv., Ess. Agrost. 18, 173. 1812. Based on *Milium punctatum* L.
Eriochloa kunthii G. Meyer, Prim. Fl. Esseq. 47. 1818. British Guiana.
Oedipachne punctata Link, Hort. Berol. 1: 51. 1827. Based on *Milium punctatum* L.
Helopus punctatus Nees, Agrost. Bras. 16. 1829. Based on *Milium punctatum* L.
Helopus kunthii Trin.; Steud., Nom. Bot. ed. 2. 1: 747. 1840. Based on *Eriochloa kunthii* G. Meyer.
Monachne punctata Nash, Bull. Torrey Bot. Club 30: 374. 1903. Based on *Milium punctatum* L.
Eriochloa polystachya var. *punctata* Maid. and Betche, Cens. N.S. Wales Pl. 16. 1916. Based on *E. punctata* Desv.
(2) **Eriochloa sericea** (Scheele) Munro; Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12[1]: pl. 1. 1890. Based on *Paspalum sericeum* Scheele, as shown by Munro manuscript in Kew Herbarium.
Paspalum racemosum Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 145. 1837. Not *P. racemosum* Lam. Red River, Ark., [*Nuttall*].
Paspalum sericeum Scheele, Linnaea 22: 341. 1849. New Braunfels, Tex., *Lindheimer*.
Panicum sericatum Scheele; Steud., Syn. Pl. Glum. 1: 58. 1854. Based on *Paspalum sericeum* Scheele.
Helopus junceus C. Muell., Bot. Ztg. 19: 314. 1861. Texas, *Drummond* 305 and 368.

(158) EUCHLAENA Schrad.

(1) **Euchlaena mexicana** Schrad., Ind. Sem. Hort. Goettingen 1832; reprinted in Linnaea 8: Litt. 25. 1833. Mexico, *Muhlenfordt*.
Reana luxurians Durieu, Bull. Soc. Acclim. II. 9: 581. 1872. This and the following are names only. They have, however, come into frequent use for teosinte.
Euchlaena luxurians Durieu and Aschers., Bull. Soc. Linn. Paris 1: 107. 1877. Based on *Reana luxurians* Durieu.
Euchlaena mexicana var. *luxurians* Haines, Bot. Bihar and Orissa pt. 6: 1065. 1924. Based on *Reana luxurians* "Brogn." (error for Durieu).
Euchlaena perennis Hitchc., Jour. Wash. Acad. Sci. 12: 207. 1922. Zapotlan, Jalisco, Mexico, *Hitchcock* 7146.

EULALIA Kunth

Eulalia viminea (Trin.) Kuntze, Rev. Gen. Pl. 2: 775. 1891. Based on *Andropogon vimineus* Trin.
Andropogon vimineus Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 268. 1832. Nepal, India.
Pollinia viminea Merr., Enum. Philipp. Pl. 1: 35. 1922. Based on *Andropogon vimineus* Trin.

(3) FESTUCA L.

Festuca amethystina L., Sp. Pl. 74. 1753. Europe.
(9) **Festuca arida** Elmer, Bot. Gaz. 36: 52. 1903. North Yakima, Wash., *Henderson* 2196.
This species was referred by Piper to *Festuca eriolepis* Desv., a South American species not known from North America.
(34) **Festuca arizonica** Vasey, Contrib. U.S. Natl. Herb. 1: 277. 1893. Flagstaff, Ariz., *Tracy* 118.
Festuca ovina var. *arizonica* Hack.; Beal, Grasses N.Amer. 2: 598. 1896. Based on *F. arizonica* Vasey.

Festuca vaseyana Hack.; Beal., Grasses N.Amer. 2: 601. 1896. Veta Pass, Colo., *Vasey.*

Festuca scabrella var. *vaseyana* Hack.; Beal, Grasses N.Amer. 2: 605. 1896. Veta Pass, Colo., *Vasey.*

Festuca altaica subsp. *arizonica* St. Yves, Candollea 2: 267. 1925. Based on *F. arizonica* Vasey.

(26) **Festuca californica** Vasey, Contrib. U.S. Natl. Herb. 1: 277. 1893. Oakland, Calif., *Bolander* 1505.

Bromus kalmii var. *aristulatus* Torr., U.S. Rept. Expl. Miss. Pacif. 4: 157. 1856. Mark West Creek, Calif., *Bigelow.*

Festuca aristulata Shear; Piper, Contrib. U.S. Natl. Herb. 10: 32. 1906. Based on *Bromus kalmii* var. *aristulatus* Torr.

Festuca aristulata parishii Piper, Contrib. U.S. Natl. Herb. 10: 33. 1906. Mill Creek Falls, San Bernardino Mountains, Calif., *Parish* 5036.

Festuca parishii Hitchc., in Jepson, Fl. Calif. 1: 169. 1912. Based on *F. aristulata parishii* Piper.

Festuca californica parishii Hitchc., in Abrams, Illustr. Fl. 1: 222. 1923. Based on *F. artistulata parishii* Piper.

Festuca altaica var. *aristulata* St. Yves, Candollea 2: 273. 1925. Based on *Bromus kalmii* var. *aristulatus* Torr.

(32) **Festuca capillata** Lam., Fl. Franç. 3: 597. 1778. France.

Festuca ovina var. *capillata* Alefeld, Landw. Fl. 354. 1866. Based on *F. capillata* Lam.

(7) **Festuca confusa** Piper, Contrib. U.S. Natl. Herb. 10: 13. pl. 1. 1906. Western Klickitat County, Wash., *Suksdorf* 1140.

Festuca microstachya var. *ciliata* A. Gray, Amer. Acad. Sci. Proc. 8: 410. 1872. Name only, for *Hall* 639 in 1871, Silver Creek, Oreg.

Festuca suksdorfii Piper; Suksdorf, Werdenda 1^2: 2. 1923. Bingen, Wash., *Suksdorf* 5604.

(27) **Festuca dasyclada** Hack.; Beal, Grasses N.Amer. 2: 602. 1896. Utah, *Parry* in 1875.

(4) **Festuca dertonensis** (All.) Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 588. 1900. Based on *Bromus dertonensis* All.

Bromus dertonensis All., Fl. Pedem. 2: 249. 1785. Italy.

Vulpia dertonensis Volk., in Schinz and Keller, Fl. Schweiz ed. 2: 57 (not in Washington); Dur. and Barr., Fl. Lib. Prodr. 269. 1910. Based on *Festuca dertonensis* Aschers. and Graebn.

This is the species referred by American authors to *F. bromoides* L. That seems to be a mixture; the name is referred to *F. myuros* by European authors.

(12) **Festuca eastwoodae** Piper, Contrib. U.S. Natl. Herb. 10: 16. 1906. Santa Lucia Mountains, Monterey County, Calif., *Eastwood.*

(17) **Festuca elatior** L., Sp. Pl. 75. 1753. Europe.

Festuca pratensis Huds., Fl. Angl. 37. 1762. England.

Festuca fluitans var. *pratensis* Huds., Fl. Angl. ed. 2. 47. 1778. Based on *F. pratensis* Huds.

Avena secunda Salisb., Prodr. Stirp. 22. 1796. Based on *Festuca elatior* L.

Bromus elatior Koel., Descr. Gram. 214. 1802. Based on *Festuca elatior* L.

Festuca poaeoides Michx., Fl. Bor. Amer. 1: 67. 1803. St. Lawrence River, *Michaux.*

Festuca poaeoides americana Pers., Syn. Pl. 1: 94. 1805. Based on *F. poaeoides* Michx.

Schedonorus elatior Beauv., Ess. Agrost. 99, 156, 177. 1812. Based on *Bromus elatior* Koel.

Schedonorus pratensis Beauv., Ess. Agrost. 99, 163, 177. 1812. Based on *Festuca pratensis* Huds.

Festuca americana F. G. Dietr., Vollst. Lex. Gärtn. Bot. Nachtr. 3: 332. 1817. Based on *F. poaeoides americana* Pers.

Schenodorus americanus Roem. and Schult., Syst. Veg. 2: 706. 1817. (Error for *Schedonorus*). Based on *Festuca poaeoides americana* Pers.

Bromus pratensis Spreng., Syst. Veg. 1: 359. 1825. Not *B. pratensis* Lam., 1785. Based on *Festuca pratensis* Huds.

Bucetum pratense Parnell, Grasses Scotl. 105. pl. 46. 1842. Based on *Festuca pratensis* Huds.

Bucetum elatius Parnell, Grasses Scotl. 107. pl. 46. 1842. Based on *Festuca elatior* L.

Festuca elatior var. *pratensis* A. Gray, Man. ed. 5. 634. 1867. Based on *F. pratensis* Huds.

Tragus elatior Panz.; Jacks., Ind. Kew. 4: 1098. 1895, as synonym of *Festuca elatior* L.

Gnomonia elatior Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca elatior* L.

FESTUCA ELATIOR var. ARUNDINACEA (Schreb.) Wimm., Fl. Schles. ed. 3. 59. 1857. Based on *F. arundinacea* Schreb.

Festuca arundinacea Schreb., Spic. Fl. Lips. 57. 1771. Germany.

Bromus arundinaceus Roth, Tent. Fl. Germ. 2: 141. 1789. Based on *Festuca arundinacea* Schreb.

(16) **Festuca elmeri** Scribn. and Merr., Bull. Torrey Bot. Club 29: 468. 1902. Stanford University, Calif., *Elmer* 2101.

FESTUCA ELMERI var. CONFERTA (Hack.) Hitchc., Amer. Jour. Bot. 21: 128. 1934. Based on *F. jonesii* var. *conferta* Hack.

Festuca jonesii var. *conferta* Hack.; Beal, Grasses N.Amer. 2: 593. 1896. San Jose Normal School, California.

Festuca elmeri luxurians Piper, Contrib. U.S. Natl. Herb. 10: 38. 1906. Based on *F. jonesii* var. *conferta* Hack.

Festuca geniculata (L.) Cav., An. Cienc. Nat. Madrid 6: 150. 1803. Based on *Bromus geniculatus* L.

Bromus geniculatus L., Mant. Pl. 33. 1767. Portugal.

Festuca gigantea (L.) Vill., Hist. Pl. Dauph. 2: 110. 1787. Based on *Bromus giganteus* L.

Bromus giganteus L., Sp. Pl. 77. 1753. Europe.

Forasaccus giganteus Bubani, Fl. Pyr. 4: 383. 1901. Based on *Bromus giganteus* L.

(8) **Festuca grayi** (Abrams) Piper, Contrib. U.S. Natl. Herb. 10: 14. pl. 3. 1906. Based on *F. microstachys grayi* Abrams.

Festuca microstachys var. *ciliata* A. Gray; Beal, Grasses N.Amer. 2: 585. 1896. Not *F. ciliata* Gouan, 1762. Grants Pass, Oreg., *Howell.* Beal's specimen is a mixture of *F. grayi* and *F. confusa*, but the description applies to *F. grayi*.

Festuca microstachys grayi Abrams, Fl. Los Angeles 52. 1904. Based on *F. microstachys* var. *ciliata* A. Gray; Beal.

(33) **Festuca idahoensis** Elmer, Bot. Gaz. 36: 53. 1903. Smiths Valley, Shoshone County, Idaho, *Abrams* 688.

Festuca ovina var. *ingrata* Hack.; Beal, Grasses N.Amer. 2: 598. 1896. Oregon, *Howell.*

Festuca ovina var. *columbiana* Beal, Grasses N.Amer. 2: 599. 1896. [Blue Mountains], Wash., *Lake.*

Festuca ovina var. *oregona* Hack.; Beal, Grasses N.Amer. 2: 599. 1896. Oregon, *Cusick* 753.

Festuca ingrata Rydb., Bull. Torrey Bot. Club 32: 608. 1905. Based on *F. ovina* var. *ingrata* Hack.

Festuca ingrata nudata Rydb., Colo. Agr. Expt. Sta. Bull. 100: 50. 1906. "*F. ovina* var. *nudata* Vasey", (herbarium name only), Colorado, [*Beardslee* in 1892].

Festuca amethystina var. *asperrima* subvar. *idahoensis* St. Yves, Candollea 2: 260. 1925. Based on *F. idahoensis* Elmer.

Festuca amethystina var. *asperrima* subvar. *robusta* St. Yves, Candollea 2: 264. 1925. Walla Walla, Wash., *Piper* 2410.

(18) **Festuca kingii** Cassidy, Colo. Agr. Expt. Sta. Bull. 12: 36. 1890. On the North Poudre, Colo. It may be based on *Poa kingii* S. Wats., though that is not cited; there is a description. Proposed as new by Scribner, U.S.Dept. Agr., Div. Agrost. Bull. 5: 36. 1897. Based on *Poa kingii* S. Wats.

Poa kingii S. Wats., in King, Geol. Expl. 40th Par. 5: 387. 1871. East Humboldt Mountains, *Watson* 1317. (Not invalidated by *Festuca kingiana* Steud., 1854.)

Festuca confinis Vasey, Bull. Torrey Bot. Club 11: 126. 1884. Pen Gulch, Colo., *Vasey.*

Festuca watsoni Nash, in Britt., Man. 148. 1901. Based on *Festuca kingii* Scribn.

Hesperochloa kingii Rydb., Bull. Torrey Bot. Club 39: 106. 1912. Based on *Poa kingii* S. Wats.

Wasatchia kingii Jones, Contrib. West. Bot. 14: 16. 1912. Based on *Poa kingii* S. Wats.

FESTUCA KINGII var. RABIOSA (Piper) Hitchc., Amer. Jour. Bot. 21: 128. 1934. Based on *F. confinis rabiosa* Piper.

Festuca confinis rabiosa Piper, Contrib. U.S. Natl. Herb. 10: 41. 1906. Crazy Womans Creek, Wyo., *Williams* and *Griffiths* 25.

(24) **Festuca ligulata** Swallen, Amer. Jour. Bot. 19: 436. f. 1. 1932. Guadalupe Mountains, Tex., *Moore* and *Steyermark* 3576.

(3) **Festuca megalura** Nutt., Jour. Acad. Phila. II. 1: 188. 1848. Santa Barbara, Calif., *Gambel.*

Vulpia megalura Rydb., Bull. Torrey Bot. Club 36: 538. 1909. Based on *Festuca megalura* Nutt.

(11) **Festuca microstachys** Nutt., Jour. Acad. Phila. II. 1: 187. 1848. Los Angeles, Calif., *Gambel.*

Vulpia microstachya Munro; Benth., Pl. Hartw. 342. 1857. Based on *Festuca microstachys* Nutt.

?*Vulpia microstachya* var. *ciliata* Munro; Benth., Pl. Hartw. 342. 1857. Name only, for *Hartweg* 281, Sacramento, Calif.

Festuca microstachys var. *subappressa* Suksdorf, Werdenda 1²: 3. 1923. Bingen, Wash., *Suksdorf* 6236.

(5) **Festuca myuros** L., Sp. Pl. 74. 1753. Europe.

Avena muralis Salisb., Prodr. Stirp. 22. 1796. Based on *Festuca myuros* L.

Vulpia myuros K. Gmel., Fl. Badens. 1: 8. 1805. Based on *Festuca myuros* L.

Festuca myuros Muhl., Descr. Gram. 160. 1817. Maryland; Georgia. Probably *F. myuros* L. is referred to, Muhlenberg's specimen being a mixture of this and *F. sciurea* Nutt.

Distomomischus myuros Dulac, Fl. Haut. Pyr. 91. 1867. Based on *Vulpia myuros* K. Gmel.

Zerna myuros Panz.; Jacks., Ind. Kew. 4: 1249. 1895, as synonym of *Festuca myuros* L.

(21) **Festuca obtusa** Spreng., Mant. Fl. Hal. 34. 1807. Pennsylvania, *Muhlenberg.*

Panicum divaricatum Michx., Fl. Bor. Amer. 1: 50. 1803. Not *P. divaricatum* L., 1753. Carolina. (Michaux's plant an old specimen with all but the lowest floret fallen from the spikelets.)

Festuca nutans Spreng., Mant. Fl. Hal. 34. 1807. Not *F. nutans* Moench, 1794. Pennsylvania, *Muhlenberg.*

Panicum gracilentum Poir., in Lam., Encycl. Sup. 4: 276. 1816. Cultivated in Paris botanic garden.

Panicum debile Poir., in Lam., Encycl. Sup. 4: 283. 1816. Not *P. debile* Desf., 1798. Based on *P. divaricatum* Michx.

Panicum patentissimum Roem. and Schult., Syst. Veg. 2: 448. 1817. Not *P. patentissimum* Desv., 1816. Based on *P. divaricatum* Michx.

Schedonorus obtusus Spreng.; Roem. and Schult., Syst. Veg. 2: 710. 1817. Based on *Festuca obtusa* Spreng.

Poa festucoides LeConte; Torr., in Eaton, Man. Bot. ed. 2. 367. 1818. New York, *LeConte.*

Poa nutans Link, Enum. Pl. 1: 86. 1821. Based on *Festuca nutans* Spreng.

Poa brachiata Desv., Opusc. 100. 1831. Based on *Panicum divaricatum* Michx.

Festuca pseudoduriuscula Steud., Syn. Pl. Glum. 1: 312. 1854. Texas, *Drummond* 398.

Steinchisma divaricatum Raf.; Jacks., Ind. Kew. 4: 982. 1895, as doubtful synonym of *Panicum debile.* Rafinesque (Bull. Bot. Seringe 1: 220. 1830) cites *Panicum divaricatum* [Michx.] under *Steinchisma,* but does not transfer the name.

Festuca nutans palustris Muhl.; Piper, Contrib. U.S. Natl. Herb. 10: 34. 1906, as synonym of *F. obtusa* Spreng.

Gnomonia nutans Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca nutans* Willd.

Festuca obtusa var. *sprengeliana* St. Yves, Candollea 2: 276. 1925. Based on *F. obtusa* Spreng.

(30) **Festuca occidentalis** Hook., Fl. Bor. Amer. 2: 249. 1840. Mouth of Columbia River, *Scouler, Douglas.*

Festuca ovina var. *polyphylla* Vasey; Beal, Grasses N.Amer. 2: 597. 1896. Cascade Mountains, Oreg., *Howell.*

(1) **Festuca octoflora** Walt., Fl. Carol. 81. 1788. South Carolina.

Festuca tenella Willd., Sp. Pl. 1: 419. 1797. North America.

Festuca setacea Poir., in Lam., Encyl. Sup. 2: 638. 1811. Grown in Jardin du Val de Grace, France, source unknown.

Schedonorus tenellus Beauv., Ess. Agrost. 99, 163, 177. 1812. Based on *Festuca tenella* Willd.

Festuca parviflora Ell., Bot. S.C. and Ga. 1: 170. 1816. Orangeburg, S.C.

Diarrhena setacea Roem. and Schult., Syst. Veg. 1: 289. 1817. Based on *Festuca setacea* Poir.

Brachypodium festucoides Link, Enum. Pl. 1: 95. 1821. Based on *Festuca tenella* L. (error for Willd.).

Festuca tenella var. *glauca* Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 147. 1837. Fort Smith, Ark., *Nuttall.*

Vulpia tenella Heynh., Nom. 1: 854. 1840. Based on *Festuca tenella* Willd.

Festuca tenella var. *aristulata* Torr., U.S. Rept. Expl. Miss. Pacif. 4^5: 156. 1856. Name only. Napa Valley, Calif., *Bigelow.*

Festuca gracilenta Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 97. 1863. Northern Texas, *Buckley.*

Festuca pusilla Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1863. California, *Nuttall.* Fernald (Rhodora 34: 211. 1932) refers this to F. *octoflora* var. *hirtella.*

Festuca octoflora aristulata Torr.; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 547. 1894. Texas.

Vulpia octoflora Rydb., Bull. Torrey Bot. Club 36: 538. 1909. Based on *Festuca octoflora* Walt.

Gnomonia octoflora Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca octoflora* Walt.

Festuca octoflora var. *tenella* Fernald, Rhodora 34: 209. 1925. Based on *F. tenella* Willd.

Festuca octoflora var. *glauca* Fernald, Rhodora 34: 209. 1925. Based on *F. tenella* var. *glauca* Nutt.

FESTUCA OCTOFLORA var. HIRTELLA Piper, Contrib. U.S. Natl. Herb. 10: 12. 1906. Santa Catalina Mountains, Ariz., *Shear* 1962. (Published as *F. octoflora hirtella.*)

(31) **Festuca ovina** L., Sp. Pl. 73. 1753. Europe.

Festuca ovina var. *vivipara* L., Sp. Pl. ed. 2. 1: 108. 1762. Sweden.

Bromus ovinus Scop., Fl. Carn. 1: 77. 1772. Based on *Festuca ovina* L.

Avena ovina Salisb., Prodr. Stirp. 22. 1796. Based on *Festuca ovina* L.

Festuca ovina var. *duriuscula* A. Gray; Port. and Coult., Syn. Fl. Colo. 150. 1874. Not *F. ovina* var. *duriuscula* Koch, 1837. Name only, for alpine specimens from Colorado [*Hall* and *Harbour* 665]. No reference to *F. duriuscula* L.

Festuca amethystina var. *asperrima* Hack.; Beal, Grasses N.Amer. 2: 601. 1896. Arizona, *Rusby* 901.

Festuca minutiflora Rydb., Bull. Torrey Bot. Club 32: 608. 1905. Cameron Pass, Colo., *Baker.*

Festuca ovina calligera Piper, Contrib. U.S. Natl. Herb. 10: 27. 1906. Based on *F. amethystina* var. *asperrima* Hack.

Festuca saximontana Rydb., Bull. Torrey Bot. Club 36: 536. 1909. Banff, Alberta, *MacCalla* 2331.

Festuca calligera Rydb., Bull. Torrey Bot. Club 36: 537. 1909. Based on *F. ovina calligera* Piper.

Gnomonia ovina Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca ovina* L.

Festuca ovina subsp. *saximontana* St. Yves, Candollea 2: 245. 1925. Based on *F. saximontana* Rydb.

Festuca ovina subsp. *saximontana* var. *rydbergii* St. Yves, Candollea 2: 245. 1925. Based on *F. saximontana* Rydb.

Festuca brevifolia var. *utahensis* St. Yves, Candollea 2: 257. 1925. Wasatch Mountains, Utah; Colorado, *Baker* 175.

FESTUCA OVINA var. BRACHYPHYLLA (Schult.) Piper, Contrib. U.S. Natl. Herb. 10: 27. 1906. Based on *F. brachyphylla* Schult. (Published as *F. ovina brachyphylla.*)

Festuca brevifolia R. Br., Sup. App. Parry's Voy. 289. 1824. Not *F. brevifolia* Muhl., 1817. Melville Island, Arctic America.

Festuca brachyphylla Schult., Mant. 3 (Add. 1): 646. 1827. Based on *F. brevifolia* R. Br.

Festuca ovina var. *brevifolia* S. Wats., in King, Geol. Expl. 40th Par. 5: 389. 1871. Based on *F. brevifolia* R. Br.

Festuca ovina subsp. *saximontana* var. *purpusiana* St. Yves, Candollea 2: 247. 1925. Farewell Gap, Calif., *Purpus* 3076, 5117.

FESTUCA OVINA var. DURIUSCULA (L.) Koch, Syn. Fl. Germ. Helv. 812. 1837. Based on *F. duriuscula* L.

Festuca duriuscula L., Sp. Pl. 74. 1753. Europe.

FESTUCA OVINA var. GLAUCA (Lam.) Koch, Syn. Fl. Germ. Helv. 812. 1837. Based on *F. glauca* Lam.

Festuca glauca Lam., Encycl. 2: 459. 1788. France.

The following varieties of *F. ovina*, recognized by Piper (North American Species of Festuca, Contrib. U.S. Natl. Herb. 10: 26–28. 1906), are based on European types. The specimens cited by him are in this Manual referred as follows:

F. ovina sciaphila (Schur) Aschers. and Graebn., to *F. ovina.*

F. ovina supina (Schur) Hack., to *F. ovina* var. *brachyphylla.*

F. ovina pseudovina Hack., to *F. ovina.*

(6) **Festuca pacifica** Piper, Contrib. U.S. Natl. Herb. 10: 12. 1906. Pullman, Wash., *Elmer* 262.

Vulpia pacifica Rydb., Bull. Torrey Bot. Club 36: 538. 1909. Based on *Festuca pacifica* Piper.

Festuca subbiflora Suksdorf, Werdenda 1²: 2. 1923. Bingen, Wash., *Suksdorf* 6144.

Festuca dives Suksdorf, Werdenda 1²: 3. 1923. Not *F. dives* Muell., 1863. Bingen, Wash., *Suksdorf* 6153.

(10) **Festuca reflexa** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 98. 1863. California.

Festuca microstachys var. *pauciflora* Scribn.; Beal, Grasses N.Amer. 2: 586. 1896. Oregon, *Howell.*

Vulpia reflexa Rydb., Bull. Torrey Bot. Club 36: 538. 1909. Based on *Festuca reflexa* Buckl.

Festuca rigescens (Presl) Kunth, Rév. Gram. 1: Sup. XXXI. 1830. Based on *Diplachne rigescens* Presl.

Diplachne rigescens Presl, Rel. Haenk. 1: 260. 1830. Peru, *Haenke.*

(29) **Festuca rubra** L., Sp. Pl. 74. 1753. Europe.

Festuca ovina var. *rubra* Smith, English Fl. 1: 139. 1824. Based on *F. rubra* L.

Festuca duriuscula var. *rubra* Wood, Amer. Bot. and Flor. pt. 2: 399. 1870. Presumably based on *F. rubra* L.

Festuca oregona Vasey, Bot. Gaz. 2: 126. 1877. Oregon.

Festuca ovina subsp. *rubra* Hook. f., Stud. Fl. ed. 3. 497. 1884. Based on *F. rubra* L.

Festuca rubra var. *littoralis* Vasey; Beal, Grasses N.Amer. 2: 607. 1896. Tillamook Bay, Oreg., *Howell* in 1882.

Festuca vallicola Rydb., Mem. N.Y. Bot. Gard. 1: 57. 1900. Silver Bow, Mont., *Rydberg* 2108.

Festuca earlei Rydb., Bull. Torrey Bot. Club 32: 608. 1905. La Plata Canyon, Colo., *Baker, Earle* and *Tracy* 920.

Festuca rubra prolifera Piper, Contrib. U.S. Natl. Herb. 10: 21. 1906. Mount Washington, N.H., *Pringle* in 1877.

Festuca rubra var. *densiuscula* Hack.; Piper, Contrib. U.S. Natl. Herb. 10: 22. 1906. Crescent City, Calif., *Davy* and *Blasdale* 5931.

Festuca rubra var. *prolifera* Piper, in Robinson, Rhodora 10: 65. 1908. Based on *F. rubra prolifera* Piper.

Festuca prolifera Fernald, Rhodora 35: 133. 1933. Based on *F. rubra prolifera* Piper.

FESTUCA RUBRA var. COMMUTATA Gaud., Fl. Helv. 1: 287. 1828. Switzerland.

Festuca fallax Thuill., Fl. Env. Paris n.ed. 50. 1799. France.

Festuca rubra var. *fallax* Hack., Bot. Centralbl. 8: 407. 1881. Based on *F. fallax* Thuill.

FESTUCA RUBRA var. HETEROPHYLLA Mutel, Fl. Franç. 4: 103. 1837. Based on *F. heterophylla* Lam.

Festuca heterophylla Lam., Fl. Franç. 3: 600. 1778. France.

FESTUCA RUBRA var. LANUGINOSA Mert. and Koch, Deut. Fl. ed. 3. 1: 654. 1823. Prussia.

Festuca arenaria Osbeck, in Retz. Sup. Prodr. Fl. Scand. 1: 4. 1805. Not *F. arenaria* Lam., 1791. Scandinavia.

Festuca rubra var. *arenaria* Fries, Fl. Halland. 28. 1818. Based on *F. arenaria* Osbeck.

Bromus secundus Presl, Rel. Haenk. 1: 263. 1830. Nootka Sound, Vancouver Island, *Haenke.*

Festuca richardsoni Hook., Fl. Bor. Amer. 2: 250. 1840. Arctic seacoast of North America, *Richardson.*

Festuca rubra var. *villosa* Vasey; Macoun, Cat. Can. Pl. 2[4]: 236. 1888. Name only, for specimen collected by Macoun at Dawson, Yukon Territory.

Festuca rubra var. *pubescens* Vasey; Beal, Grasses N.Amer. 2: 607. 1896. Not *F. rubra* var. *pubescens* Spenner, 1825. Oregon, *Howell.*

Festuca rubra var. *secunda* Scribn., Rept. Mo. Bot. Gard. 10: 39. 1899. Based on *Bromus secundus* Presl.

Festuca rubra var. *subvillosa* forma *vivipara* Eames, Rhodora 11: 89. 1909. Newfoundland, Governors Island, *Eames* and *Godfrey.*

The following varieties of *Festuca rubra*, recognized by Piper (North American Species of Festuca, Contrib. U.S. Natl. Herb. 10: 21–23. 1906), are based on European types. The specimens cited by him are in this Manual referred as follows:

F. rubra megastachya Gaud., to *F. rubra.*

F. rubra glaucodea Piper (based on *F. glaucescens* Hegetschw.), to *F. rubra.*

F. rubra multiflora (Hoffm.) Aschers. and Graebn., to *F. rubra.*

F. rubra pruinosa Hack., to *F. rubra.*

F. rubra lanuginosa Mert. and Koch, to *F. rubra* var. *lanuginosa.*

F. rubra kitaibeliana (Schult.) Piper, to *F. rubra* var. *lanuginosa.*

(25) **Festuca scabrella** Torr.; Hook., Fl. Bor. Amer. 2: 252. 1840. Rocky Mountains, *Drummond.*

Melica hallii Vasey, Bot. Gaz. 6: 296. 1881. Rocky Mountains, latitude 39° to 41° [north half of Colorado], *Hall* and *Harbour* 621.

Festuca hallii Piper, Contrib. U.S. Natl. Herb. 10: 31. 1906. Based on *Melica hallii* Vasey.

Daluca hallii Lunell, Amer. Midl. Nat. 4: 221. 1915. Based on *Melica hallii* Vasey.

Festuca altaica subsp. *arizonica* subvar. *hallii* St. Yves, Candollea 2: 271. 1925. Based on *Melica hallii* Vasey.

FESTUCA SCABRELLA var. MAJOR Vasey, Contrib. U.S. Natl. Herb. 1: 278. 1893. Spokane County, Wash., *Suksdorf* 118.

Festuca campestris Rydb., Mem. N.Y. Bot. Gard. 1: 57. 1900. Based on *F. scabrella* var. *major* Vasey.

(2) **Festuca sciurea** Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 147. 1837. Arkansas, *Nuttall.*

?*Festuca quadriflora* Walt., Fl. Carol. 81. 1788. Not *F. quadriflora* Honck., 1782. South Carolina.

Festuca monandra Ell., Bot. S.C. and Ga. 1: 170. 1816, as synonym of *F. myuros* L., as misapplied by Elliott.

Dasiola elliotea Raf., Neogenyt. 4. 1825. Not *Festuca elliotii* Hack. Based on *Festuca monandra* Ell.

Vulpia quadriflora Trin.; Steud., Nom. Bot. ed. 2. 2: 780. 1841. Based on *Festuca quadriflora* Walt.

(22) **Festuca shortii** Kunth; Wood, Class-book 794. 1861; A. Gray, Man. ed. 6. 669. 1890. Noted in both as a variation of *F. nutans.* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 548. 1894. Central Texas to Illinois. This is the first description of the species. In Wood the following note is appended to the description of *F. nutans:* "(*F. shortii* Kunth, when the grass is stouter and the spikelets about 5-flowered.)" In the National Herbarium are several specimens of this species named "*Festuca shortii* Kth" in Vasey's script, "Kth?" queried on some of them. On one, collected in Illinois by Vasey, is the note "*Festuca nutans* var. probably a good species, and I have a specimen from Mr. Wolf ticketed *F. Shortii* Kunth, but I do not find such a species published." Since Vasey in the herbarium credited the species to Kunth it may be assumed that Dewey inadvertently omitted that name. The original connection with Kunth remains obscure. In the Gray Herbarium is a specimen of this species with "Barrens of Ky." written on a label printed "C. W. Short, M.D., Kentucky, 1842."

?*Festuca nutans* var. *palustris* Wood, Amer. Bot. and Flor. pt. 2: 399. 1870. Eastern States.

Festuca nutans var. *shortii* Beal, Grasses N.Amer. 2: 589. 1896. Based on *F. shortii* Kunth.

Festuca nutans var. *major* Vasey, U.S. Dept. Agr. Spec. Rept. 63: 43. 1883. Name only; Beal, Grasses N.Amer. 2: 589. 1896, as synonym of *F. nutans* var. *shortii* Beal.

(19) **Festuca sororia** Piper, Contrib. U.S. Natl. Herb. 16: 197. 1913. Rincon Mountains, Ariz., *Nealley* 177.

Festuca subulata var. *sororia* St. Yves, Candollea 2: 285. 1925. Based on *F. sororia* Piper.

(15) **Festuca subulata** Trin., in Bong., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 173. 1832. Sitka, Alaska, *Mertens.*
Festuca jonesii Vasey, Contrib. U.S. Natl. Herb. 1: 278. 1893. Utah, *Jones* in 1880.
Festuca subulata var. *jonesii* St. Yves, Candollea 2: 284. 1925. Based on *F. jonesii* Vasey.

(14) **Festuca subuliflora** Scribn.; Macoun, Cat. Can. Pl. 2^5: 396. 1890. Goldstream, Vancouver Island, *Macoun* 7. (By a slip of the pen the name is given as "*subulifolia*" in a note following.)
Festuca ambigua Vasey, Contrib. U.S. Natl. Herb. 1: 277. 1893. Not *F. ambigua* Le Gall. 1852. Oregon, *Howell* 19 in 1881.
Festuca denticulata Beal, Grasses N.Amer. 2: 589. 1896. Based on *F. ambigua* Vasey.

(23) **Festuca thurberi** Vasey, Cat. Pl. Survey W. 100th Merid. 56. 1874. South Park, Colo., *Wolf* 1154.
Poa festucoides Jones, Calif. Acad. Sci. Proc. II. 5: 723. 1895. Not *P. festucoides* Lam., 1791. Mount Ellen, Henry Mountains, Utah, *Jones* 5671.
Poa kaibensis Jones, Erythea 4: 36. 1896. Based on P. *festucoides* Jones.
Festuca tolucensis subsp. *thurberi* St. Yves, Candollea 2: 304. 1925. Based on *F. thurberi* Vasey.

(13) **Festuca tracyi** Hitchc., in Abrams, Illustr. Fl. 1: 220. 1923. Howell Mountain, Napa County, Calif., *J. P. Tracy* 1479.

(20) **Festuca versuta** Beal, Grasses N.Amer. 2: 589. 1896. Based on F. *texana* Vasey.
Festuca texana Vasey, Bull. Torrey Bot. Club 13: 119. 1886. Not *F. texana* Steud., 1854. Upper Llano, Tex., *Reverchon* 1618.
Festuca nutans var. *johnsoni* Vasey, Contrib. U.S. Natl. Herb. 2: 548. 1894. Harrison City, Tex., *Johnson.*
Festuca johnsoni Piper, Contrib. U.S. Natl. Herb. 10: 35. 1906. Based on *F. nutans* var. *johnsoni* Vasey.
Festuca obtusa subsp. *versuta* St. Yves, Candollea 2: 280. 1925. Based on *F. versuta* Beal.

(28) **Festuca viridula** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13^2: pl. 93. 1893. California (probably Summit Station), *Bolander.*
Festuca howellii Hack.; Beal, Grasses N.Amer. 2: 591. 1896. Oregon, *Howell* [248].
Gnomonia viridula Lunell, Amer. Midl. Nat. 4: 224. 1915. Based on *Festuca viridula* Vasey.
Festuca viridula var. *vaseyana* St. Yves, Candollea 2: 265. 1925. Based on *F. viridula* Vasey.
Festuca viridula var. *howellii* St. Yves, Candollea 2: 266. 1925. Based on *F. howellii* Hack.

(8) FLUMINEA Fries

(1) **Fluminea festucacea** (Willd.) Hitchc., U.S.Dept.Agr. Bull. 772: 38. f. 11. 1920. Based on *Arundo festucacea* Willd.
Festuca arundinacea Liljebl., Utk. Svensk Fl. ed. 2. 47. 1798. Not *F. arundinacea* Schreb., 1771. Sweden.
Arundo festucacea Willd., Enum. Pl. 1: 126. 1809. Germany.
Scolochloa festucacea Link, Hort. Berol. 1: 137. 1827. Based on *Arundo festucacea* Willd.
Triodia festucacea Roth, Enum. Pl. Phaen. Germ. 1^1: 382. 1827. Based on *Arundo festucacea* Willd.
Graphephorum festucaceum A. Gray, Amer. Acad. Sci. Proc. 5: 191. 1861. Based on *Arundo festucacea* Willd.
Scolochloa arundinacea MacM., Met. Minn. Vall. 79. 1892. Not *S. arundinacea* Mert. and Koch, 1823. Based on *Festuca arundinacea* Liljebl.

(73) GASTRIDIUM Beauv.

(1) **Gastridium ventricosum** (Gouan) Schinz and Thell., Vierteljahrs. Nat. Ces Zürich 58: 39. 1913. Based on *Agrostis ventricosa* Gouan.
Agrostis ventricosa Gouan, Hort. Monsp. 39. pl. 1. f. 2. 1762. France.
Milium lendigerum L., Sp. Pl. ed. 2. 91. 1762. Europe.
Agrostis australis L., Mant. Pl. 1: 30. 1767. Portugal.
Alopecurus ventricosus Huds., Fl. Angl. ed. 2. 1: 28. 1778. Based on *Agrostis ventricosa* Gouan.

Agrostis lendigera Neck., Elem. Bot. 3: 219. 1791. Based on *Milium lendigerum* L.
Avena lendigera Salisb., Prodr. Stirp. 23. 1796. Based on *Milium lendigerum* L.
Gastridium australe Beauv., Ess. Agrost. 21, 164. pl. 6. f. 6. 1812. Europe.
Gastridium lendigerum Desv., Obs. Angers 48. 1818. Based on *Milium lendigerum* L.
Chilochloa ventricosa Beauv.; Steud., Nom. Bot. ed. 2. 1: 350. 1840, as synonym of *Alopecurus ventricosus* Huds.
Lachnagrostis phlcoides Nees and Meyen; Nees, Nov. Act. Acad. Caes. Leop. Carol. 19: Sup. 1: 14. 1841; 146. 1843. Valparaiso, Chile.

(6) GLYCERIA R. Br.

(1) **Glyceria acutiflora** Torr., Fl. North. and Mid. U.S. 1: 104. 1823. New York, New Jersey, and Massachusetts, *Festuca brevifolia* Muhl. erroneously cited as synonym.
Festuca acutiflora Bigel., Fl. Bost. ed. 3. 39. 1840. Based on *Glyceria acutiflora* Torr.
Panicularia acutiflora Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Glyceria acutiflora* Torr.
(4) **Glyceria arkansana** Fernald, Rhodora 31: 49. 1929. Varner, Ark., *Bush* 9 in 1898.
(2) **Glyceria borealis** (Nash) Batchelder, Manchester Inst. Proc. 1: 74. 1900. Based on *Panicularia borealis* Nash.
Glyceria fluitans var. *angustata* Vasey; Fernald, Portland Soc. Nat. Hist. Proc. 2: 91. 1895. Maine, *Fernald* [193].
Panicularia borealis Nash, Bull. Torrey Bot. Club 24: 348. 1897. Maine, *Fernald.*
(12) **Glyceria canadensis** (Michx.) Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 366. 1830. Based on *Briza canadensis* Michx.
Briza canadensis Michx., Fl. Bor. Amer. 1: 71. 1803. Canada, *Michaux.*
Megastachya canadensis Michx.; Roem. and Schult., Syst. Veg. 2: 593. 1817. Based on *Briza canadensis* Michx.
?*Briza canadensis* Nutt., Gen. Pl. 1: erratum. 1818. Not op. cit. 69. New Jersey, near Philadelphia.
Nevroloma canadensis Raf., Jour. Phys. Chym. 89: 106. 1819. Based on *Briza canadensis* Michx.
Poa canadensis Torr., Fl. North. and Mid. U.S. 1: 112. 1823. Based on *Briza canadensis* Michx.
Panicularia canadensis Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Briza canadensis* Michx.
Glyceria canadensis var. laxa (Scribn.) Hitchc., Amer. Jour. Bot. 21: 128. 1934. Based on *Panicularia laxa* Scribn.
Panicularia laxa Scribn., Bull. Torrey Bot. Club 21: 37. 1894. Mount Desert, Maine, *Redfield* and *Rand.*
Glyceria laxa Scribn.; Rand and Redfield, Fl. Mt. Desert 180. 1894. Based on *Panicularia laxa* Scribn.
Glyceria canadensis var. *parviflora* Fernald, Portland Soc. Nat. Hist. Proc. 2: 91. 1895, as synonym of *G. laxa* Scribn.
(14) **Glyceria elata** (Nash) Hitchc., in Jepson, Fl. Calif. 1: 162. 1912. Based on *Panicularia elata* Nash.
Panicularia elata Nash, in Rydb., Mem. N.Y. Bot. Gard. 1: 54. 1900. Montana, *Flodman* 176.
Glyceria latifolia Cotton, Bull. Torrey Bot. Club 29: 573. 1902. Washington, *Elmer* 721.
Panicularia nervata elata Piper, Contrib. U.S. Natl. Herb. 11: 140. 1906. Based on *P. elata* Nash.
(9) **Glyceria erecta** Hitchc., in Jepson, Fl. Calif. 1: 161. 1912. Yosemite, Calif., *Hitchcock* 3250½.
Panicularia erecta Hitchc., Amer. Jour. Bot. 2: 309. 1915. Based on *Glyceria erecta* Hitchc.
(6) **Glyceria fluitans** (L.) R. Br., Prodr. Fl. Nov. Holl. 1: 179. 1810. Based on *Festuca fluitans* L.
Festuca fluitans L., Sp. Pl. 75. 1753. Europe.
Hydrochloa fluitans Hartm., Gen. Gram. Scand. 8. 1819. Presumably based on *Festuca fluitans* L.

Melica fluitans Raspail, Ann. Sci. Nat., Bot. 5: 443. 1825. Based on *Festuca fluitans* L.

Devauxia fluitans Beauv.; Kunth, Enum. Pl. 1: 367. 1833, as synonym of *Glyceria fluitans* R. Br.

Panicularia fluitans Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Festuca fluitans* L.

Panicularia brachyphylla Nash, Bull. Torrey Bot. Club 24: 349. 1897. Near New York City, *Nash.*

(16) **Glyceria grandis** S. Wats.; A. Gray, Man. ed. 6. 667. 1890. [Type from Quebec, *Munro* in 1858]. New England to western New York, Michigan, Minnesota, and westward.

Poa aquatica var. *americana* Torr., Fl. North. and Mid. U.S. 1: 108. 1823. Massachusetts, *Cooley.*

Panicularia americana MacM., Met. Minn. Vall. 81. 1892. Based on *Poa aquatica* var. *americana* Torr.

Glyceria americana Pammel, Iowa Geol. Survey Sup. Rept. 1903: 271. 1905. Based on *Poa aquatica* var. *americana* Torr.

Glyceria flavescens Jones, Mont. Univ. Bull. Biol. Ser. 15: 17. pl. 2. 1910. Swan Lake, Mont., *Jones* [9697].

Panicularia grandis Nash, in Britt. and Brown, Illustr. Fl. ed. 2. 1: 265. 1913. Based on *Glyceria grandis* S. Wats.

(3) **Glyceria leptostachya** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1863. Oregon, *Nuttall.*

Panicularia davyi Merr., Rhodora 4: 145. 1902. Sonoma County, Calif., *Davy* 6005.

Panicularia leptostachya Piper; Piper and Beattie, Fl. Northw. Coast 59. 1915. Not *P. leptostachya* Maclosk., 1904. Based on *Glyceria leptostachya* Buckl.

(11) **Glyceria melicaria** (Michx.) F. T. Hubb., Rhodora 14: 186. 1912. Based on *Panicum melicarium* Michx.

Panicum melicarium Michx., Fl. Bor. Amer. 1: 50. 1803. Carolina, *Michaux* [Michaux's specimen overmature, all the florets but the lowermost fallen from the spikelets.]

Poa torreyana Spreng., Neu. Entd. 2: 104. 1821. Massachusetts.

Poa elongata Torr.; Spreng., Neu. Entd. 2: 104. 1821. Not *P. elongata* Willd., 1809. As synonym of *P. torreyana* Spreng.

Poa elongata Torr., Fl. North. and Mid. U.S. 1: 112. 1823. Not *P. elongata* Willd., 1809. Massachusetts, *Cooley.*

Glyceria elongata Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2[1]: 58. 1836. Based on *Poa elongata* Torr.

Panicularia elongata Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Poa elongata* Torr.

Panicularia torreyana Merr., Rhodora 4: 146. 1902. Based on *Poa torreyana* Spreng.

Glyceria torreyana Hitchc., Rhodora 8: 211. 1906. Based on *Poa torreyana* Spreng.

Panicularia melicaria Hitchc., Contrib. U.S. Natl. Herb. 12: 149. 1908. Based on *Panicum melicarium* Michx.

(18) **Glyceria neogaea** Steud., Syn. Pl. Glum 1: 285. 1854. Newfoundland.

Glyceria pallida var. *fernaldii* Hitchc., Rhodora 8: 211. 1906. Maine, *Fernald* 191.

Glyceria fernaldii St. John, Rhodora 19: 76. 1917. Based on *Glyceria pallida* var. *fernaldii* Hitchc.

Panicularia fernaldii Hitchc.; House, N.Y. State Mus. Bull. 233–234: 11. 1921. Based on *Glyceria pallida* var. *fernaldii* Hitchc.

Glyceria nubigena Anders., Rhodora 35: 321. f. B. 1933. Clingmans Dome, Great Smoky Mountains, Tenn., *Anderson* and *Jennison* 1418.

(10) **Glyceria obtusa** (Muhl.) Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 366. 1830. Based on *Poa obtusa* Muhl.

Poa obtusa Muhl., Descr. Gram. 147. 1817. Pennsylvania, *Muhlenberg.*

Panicularia obtusa Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Poa obtusa* Muhl.

(7) **Glyceria occidentalis** (Piper) J. C. Nels., Torreya 19: 224. 1919. Based on *Panicularia occidentalis* Piper.

Panicularia occidentalis Piper; Piper and Beattie, Fl. Northw. Coast 59. 1915. Vancouver, Wash., *Piper* 4905.

(15) **Glyceria otisii** Hitchc., Amer. Jour. Bot. 21: 128. 1934. Jefferson County, Wash., *Otis* 1548.

(17) **Glyceria pallida** (Torr.) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2[1]: 57. 1836. Based on *Windsoria pallida* Torr.
Windsoria pallida Torr., Cat. Pl. N.Y. 91. 1819. New York.
Triodia pallida Spreng., Neu. Entd. 1: 246. 1820. New York, "*Windsoria pallida* Eddy in litt"; Spreng., Syst. Veg. 1: 330. 1825. Based on *Windsoria pallida* Torr.
Poa dentata Torr., Fl. North. and Mid. U.S. 1: 107. 1823. Based on *Windsoria pallida* Torr.
Uralepis pallida Kunth, Rév. Gram. 1: 108. 1829. Based on *Windsoria pallida* Torr.
Panicularia pallida Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Windsoria pallida* Torr.

(8) **Glyceria pauciflora** Presl, Rel. Haenk. 1: 257. 1830. Nootka Sound, Vancouver Island, *Haenke.*
Glyceria microtheca Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1863. Oregon, *Nuttall.*
Glyceria spectabilis var. *flaccida* Trin.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863, as synonym of *G. microtheca* Buckl., *G. leptostachya* Buckl. confused with it.
Panicularia pauciflora Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Glyceria pauciflora* Presl.
Panicularia holmii Beal, Torreya 1: 43. 1901. Longs Peak, Colo., *Holm* 249.
Panicularia multifolia Elmer, Bot. Gaz. 36: 54. 1903. Olympic Mountains, Wash., *Elmer* 1939.
Panicularia flaccida Elmer, Bot. Gaz. 36: 55. 1903. Olympic Mountains, Wash., *Elmer* 1940.

(5) **Glyceria septentrionalis** Hitchc., Rhodora 8: 211. 1906. New Jersey, *Van Sickle.*
Panicularia septentrionalis Bicknell, Bull. Torrey Bot. Club. 35: 196. 1908. Based on *Glyceria septentrionalis* Hitchc.
Panicularia fluitans var. *septentrionalis* Farwell, Mich. Acad. Sci. Rept. 21: 353. 1920. Based on *Glyceria septentrionalis* Hitchc.

(13) **Glyceria striata** (Lam.) Hitchc., Proc. Biol. Soc. Wash. 41: 157. 1928. Based on *Poa striata* Lam.
Poa striata Lam., Tabl. Encycl. 1: 183. 1791. Virginia; Carolina.
Poa nervata Willd., Sp. Pl. 1: 389. 1797. North America.
Poa striata Michx., Fl. Bor. Amer. 1: 69. 1803. Pennsylvania, *Michaux.*
Poa lineata Pers., Syn. Pl. 1: 89. 1805. Based on *P. striata* Michx.
Poa parviflora Pursh, Fl. Amer. Sept. 1: 80. 1814. Not *P. parviflora* R. Br., 1810. New York to Virginia.
Poa sulcata Roem. and Schult., Syst. Veg. 2: 550. 1817. Not *P. sulcata* Lag., 1816. Based on *P. striata* Lam.
Briza canadensis Nutt., Gen. Pl. 1: 69. 1818. Not *B. canadensis* Michx., 1803. Canada and Pennsylvania. (Canada refers to Michaux's species, Nuttall misunderstanding it.)
Glyceria michauxii Kunth, Rév. Gram. 1: 118. 1829. Based on *Poa striata* Michx.
Glyceria nervata Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 365. 1830. Based on *Poa nervata* Willd.
Poa lamarckii Kunth, Enum. Pl. 1: 362. 1833. Based on *P. striata* Lam.
Panicularia nervata Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Poa nervata* Willd.
Panicularia nervata forma *major* Millsp., Fl. W.Va. 473. 1892. Monongalia, W.Va.
Panicularia nervata stricta Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 13: 44. 1898. Colorado-Wyoming State line, *A. Nelson* 3818.
Panicularia nervata rigida Nash, in Rydb., Mem. N.Y. Bot. Gard. 1: 54. 1900. Montana, *Rydberg* 2068.
Panicularia nervata var. *parviglumis* Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 30: 8. 1901. Racine, Wis. *Wadmond* 36.
Glyceria nervata var. *stricta* Scribn.; Hitchc., in A. Gray, Man. ed. 7. 159. 1908. Based on *Panicularia nervata stricta* Scribn.
Glyceria nervata var. *rigida* Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Panicularia nervata rigida* Nash.
Panicularia rigida Rydb., Fl. Rocky Mount. 83. 1917. Based on *P. nervata rigida* Nash.
Panicularia nervata var. *filiformis* Farwell, Mich. Acad. Sci. Rept. 20: 168. 1919. Michigan, *Farwell* 4514½.

Panicularia nervata var. *purpurascens* Farwell, Mich. Acad. Sci. Rept. 20: 168. 1919. Michigan, *Farwell* 4495½ (first of several specimens cited).
Panicularia nervata var. *viridis* Farwell, Mich. Acad. Sci. Rept. 22: 180. 1921. Michigan, *Farwell* 5234.
Glyceria striata var. *stricta* Fernald, Rhodora 31: 47. 1929. Based on *Panicularia nervata stricta* Scribn.

(101) GYMNOPOGON Beauv.

(1) **Gymnopogon ambiguus** (Michx.) B.S.P., Prel. Cat. N.Y. 69. 1888. Presumably based on *Andropogon ambiguus* Michx.
Andropogon ambiguus Michx., Fl. Bor. Amer. 1: 58. 1803. Carolina, *Michaux.*
Gymnopogon racemosus Beauv., Ess. Agrost. 41, 164. pl. 9. f. 3. 1812. Based on *Andropogon ambiguus* Michx.
Anthopogon lepturoides Nutt., Gen. Pl. 82. 1818. Banks of the Potomac, near Harpers Ferry, Va.
Gymnopogon scoparius Trin., Gram. Unifl. 237. 1824. New Jersey.
Alloiatheros lepturoides Steud., Nom. Bot. ed. 2. 1: 55. 1840, as synonym of *Gymnopogon racemosus* Beauv.
Stipa expansa Willd.; Steud., Nom. Bot. ed. 2. 2: 643. 1841, as synonym of *Gymnopogon racemosus* Beauv.
Gymnopogon distichophyllus Steud., Syn. Pl. Glum. 1: 218. 1854. Texas, Seubert Herb. [coll. *Vinzent*] 128; Louisiana, *Hartmann* 57.
Sciadonardus distichophyllus Steud., Flora 33: 229. 1850; Syn. Pl. Glum. 1: 218. 1854, as synonym of *Gymnopogon distichophyllus.* Louisiana, *Hartmann* 57.
Agrostis boeckeleri Seubert; Steud., Syn. Pl. Glum. 1: 218. 1854, as synonym of *Gymnopogon distichophyllus.* Texas [*Vinzent* 128].
Alloiatheros ambiguus Ell.; Jacks., Ind. Kew. 1: 83. 1893, as synonym of *Gymnopogon racemosus.*
Alloiatheros aristatus Raf.; Jacks., Ind. Kew. 1: 83. 1893, as synonym of *Gymnopogon racemosus.*
(2) **Gymnopogon brevifolius** Trin., Gram. Unifl. 238. 1824. Delaware.
Anthopogon brevifolius Nutt.; Trin., Gram. Unifl. 238. 1824, as synonym of *Gymnopogon brevifolius* Trin.
Anthopogon filiforme Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 152. 1837. Banks of the Arkansas and in Delaware.
(3) **Gymnopogon chapmanianus** Hitchc., Amer. Jour. Bot. 2: 306. 1915. Sanford, Fla., *Chase* 4135.

GYNERIUM Humb. and Bonpl.

Gynerium sagittatum (Aubl.) Beauv., Ess. Agrost. 138. 1812. Based on *Saccharum sagittatum* Aubl.
Saccharum sagittatum Aubl., Pl. Guian. 1: 50. 1775. French Guiana.
Arundo sagittata Pers., Syn. Pl. 1: 102. 1805. Based on *Saccharum sagittatum* Aubl.
Gynerium saccharoides Humb. and Bonpl., Pl. Aequin. 2: 105. pl. 115. 1809. Venezuela, *Humboldt* and *Bonpland.*
Gynerium procerum Beauv., Ess. Agrost. Atlas, pl. 24. f. 6. 1812. Based on *Saccharum sagittatum* Aubl.
Arundo saccharoides Poir., in Lam., Encycl. Sup. 4: 703. 1816. Based on *Gynerium saccharoides* Humb. and Bonpl.

(155) HACKELOCHLOA Kuntze

(1) **Hackelochloa granularis** (L.) Kuntze, Rev. Gen. Pl. 2: 776. 1891. Based on *Cenchrus granularis* L.
Cenchrus granularis L., Mant. Pl. 2: 575. 1771. East Indies.
Manisuris granularis Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Based on *Cenchrus granularis* L. The name was earlier given (L. f. Nov. Gram. Gen. 40. pl. 1. f. 4–7. 1779) without description or basis. *Manisuris*, based on this species, has been credited to Swartz (not *Manisuris* L.), but Swartz does not propose the genus as new. He includes the original *M. myuros* L. and adds *M. granularis.*
Tripsacum granulare Raspail, Ann. Sci. Nat., Bot. 5: 306. 1825. Based on *Manisuris granularis* Swartz.

Rytilix glandulosa Raf., Bull. Bot. Seringe 1: 219. 1830. Change of name or slip of the pen for "*granularis*", "*Manisuris granularis*" being cited.
Rytilix granularis Skeels, U.S.Dept.Agr., Bur. Plant Indus. Bull. 282: 20. 1913. Based on *Cenchrus granularis* L.

(79) HELEOCHLOA Host [22]

Heleochloa alopecuroides (Pill. and Mitterp.) Host, Icon. Gram. Austr. 1: 23. pl. 29. 1801. Based on *Phleum alopecuroides* Pill. and Mitterp.
Phleum alopecuroides Pill. and Mitterp., Iter Posegan. 147. pl. 16. 1783. Europe.
Crypsis alopecuroides Schrad., Fl. Germ. 1: 167. 1806. Based on *Heleochloa alopecuroides* Host.
(1) **Heleochloa schoenoides** (L.) Host, Icon. Gram. Austr. 1: 23. pl. 30. 1801. Based on *Phleum schoenoides* L.
Phleum schoenoides L., Sp. Pl. 60. 1753. Southern Europe.
Crypsis schoenoides Lam., Tabl. Encycl. 1: 166. pl. 42. 1791. Based on *Phleum schoenoides* L. This name is spelled *C. schenoides* by Beauv., Ess. Agrost. 23. 1812.

(150) HETEROPOGON Pers.

(1) **Heteropogon contortus** (L.) Beauv.; Roem. and Schult., Syst. Veg. 2: 836 1817. Based on *Andropogon contortus* L.
Andropogon contortus L., Sp. Pl. 1045. 1753. India.
Heteropogon glaber Pers., Syn. Pl. 2: 533. 1807. Europe.
Heteropogon hirtus Pers., Syn. Pl. 2: 533. 1807. Based on *Andropogon contortus* L.
Andropogon glaber Raspail, Ann. Sci. Nat., Bot. 5: 307. 1825. Not *A. glaber* Roxb., 1820. Based on *Heteropogon glaber* Pers.
Andropogon secundus Willd.; Nees, Agrost. Bras. 364. 1829, as synonym of *Heteropogon contortus* Willd. Described in Griseb., Fl. Brit. W. Ind. 558. 1864. Not *A. secundus* Ell., 1821. Antigua, *Wullschlaegel.*
Heteropogon firmus Presl, Rel. Haenk. 1: 334. 1830. Mexico, *Haenke.*
Andropogon firmus Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Based on *Heteropogon firmus* Presl.
Heteropogon contortus var. *hirtus* Fenzl; Hack., in Mart. Fl. Bras. 2^3: 267. 1883. Based on *H. hirtus* Pers.
Heteropogon contortus var. *glaber* Hack., in Mart., Fl. Bras. 2^3: 268. 1883. Based on *H. glaber* Pers.
Andropogon contortus subvar. *secundus* Hack., in DC., Monogr. Phan. 6: 587. 1889. Based on *A. secundus* Willd.
Andropogon contortus subvar. *glaber* Hack., in DC., Monogr. Phan. 6: 587. 1889. Based on *Heteropogon glaber* Pers.
Sorghum contortum Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Andropogon contortus* L.
Holcus contortus Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Based on *Andropogon contortus* L.
Heteropogon contortus subvar. *secundus* Domin, Bibl. Bot. 85: 276. 1915. Based on *Andropogon contortus* var. *secundus* Hack.
(2) **Heteropogon melanocarpus** (Ell.) Benth., Jour. Linn. Soc. Bot. 19: 71. 1881. Based on *Andropogon melanocarpus* Ell.
Andropogon melanocarpus Ell., Bot. S.C. and Ga. 1: 146. 1816. Between Altamaha and Jefferson, Ga.
Stipa melanocarpa Muhl., Descr. Gram. 183. 1817. Georgia.
Cymbopogon melanocarpus Spreng., Syst. Veg. 1: 289. 1825. Based on *Andropogon melanocarpus* Ell.
Trachypogon scrobiculatus Nees, Agrost. Bras. 347. 1829. Piauhy, Brazil, [*Martius*].
Andropogon scrobiculatus Kunth, Rév. Gram. 1: Sup. XL. 1830. Based on *Trachypogon scrobiculatus* Nees.

[22] The nomenclature of this genus is much confused. *Heleochloa* Host (Icon. Gram. 1801) appears first without generic description, hence is not effectively published. Beauvois (Ess. Agrost. 23. pl. 7. f. 2. 1812) describes *Heleochloa* but bases it on two species, *H. juncea* (*Agrostis juncea*) and *H. phalaroides* (*Phleum phleoides*), these not included in *Heleochloa* by Host. Hence *Heleochloa* Host, as used by Beauvois, is not the same genus as that of Host himself (loc. cit. and Gram. Austr. 1827). I have, nevertheless, retained *Heleochloa* as generally understood, that is, as figured, though not described, by Host.

Heteropogon acuminatus Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 254. 1832. Brazil.
Heteropogon scrobiculatus Fourn., Mex. Pl. 2: 64. 1886. Based on *Trachypogon scrobiculatus* Nees.
Sorghum melanocarpum Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon melanocarpus* Ell.
Heteropogon melanocarpus Coult., Contrib. U.S. Natl. Herb. 2: 493. 1894. Based on *Stipa melanocarpa* Muhl.
Spirotheros melanocarpus Raf.; Jacks., Ind. Kew. 4: 967. 1895, as synonym of *Heteropogon acuminatus*.

(108) HIEROCHLOË R. Br.

(1) **Hierochloë alpina** (Swartz) Roem. and Schult., Syst. Veg. 2: 515. 1817. Based on *Holcus alpinus* Swartz.
Aira alpina Liljebl., Utk. Svensk Fl. 49. 1792. Not *A. alpina* L., 1753. Sweden.
Holcus alpinus Swartz; Willd., Sp. Pl. 4: 937. 1806. Lapland.
Holcus monticola Bigel., New England Jour. Med. and Surg. 5: 334. 1816; Eaton, Man. Bot. ed. 2. 273. 1818. White Hills, N.H., *Bigelow*.
Hierochloa alpina var. *aristata* Raspail, in Saig. and Rasp., Ann. Sci. Obs. 2: 85. 1829. Based on "*H. alpina* R. Br." (probably in Parry's Voyage), same as Roem. and Schult.
Dimesia monticola Raf.; Jacks., Ind. Kew. 2: 760. 1893, as synonym of *Holcus monticola*.
Savastana alpina Scribn., Mem. Torrey Bot. Club 5: 34. 1894. Based on *Holcus alpinus* Swartz.
Torresia alpina Hitchc., Amer. Jour. Bot. 2: 300. 1915. Based on *Holcus alpinus* Swartz.

(3) **Hierochloë occidentalis** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1863. Columbia woods, [Oregon], *Nuttall*.
Hierochloë macrophylla Thurb.; Boland., Calif. Agr. Soc. Trans. 1864–65: 132. 1866; S. Wats., Bot. Calif. 2: 265. 1880. Coast Range, Calif., *Bolander* 2279.
Savastana macrophylla Beal, Grasses N.Amer. 2: 187. 1896. Based on *Hierochloë macrophylla* Thurb.
Torresia macrophylla Hitchc., Amer. Jour. Bot. 2: 300. 1915. Based on *Hierochloë macrophylla* Thurb.

(2) **Hierochloë odorata** (L.) Beauv., Ess. Agrost. 62, 164. pl. 12. f. 5. 1812. Based on *Holcus odoratus* L.
Holcus odoratus L., Sp. Pl. 1048. 1753. Europe.
Avena odorata Koel., Descr. Gram. 299. 1802. Based on *Holcus odoratus* L.
Holcus fragrans Willd., Sp. Pl. 4: 936. 1806. Hudson Bay, Canada.
Holcus borealis Schrad., Fl. Germ. 1: 252. 1806. Germany.
Hierochloa borealis Roem. and Schult., Syst. Veg. 2: 513. 1817. Based on *Holcus borealis* Schrad.
Hierochloa fragrans Roem. and Schult., Syst. Veg. 2: 514. 1817. Based on *Holcus fragrans* Willd.
Hierochloa arctica Presl, Rel. Haenk. 1: 252. 1830. Nootka Sound, Vancouver Island, *Haenke*.
Hierochloa odorata var. *fragrans* Richt., Pl. Eur. 1: 31. 1890. Based on *Holcus fragrans* Willd.
Dimesia fragrans Raf.; Jacks., Ind. Kew. 2: 760. 1893, as synonym of *Hierochloë borealis*.
Savastana odorata Scribn., Mem. Torrey Bot. Club 5: 34. 1894. Based on *Holcus odoratus* L.
Savastana nashii Bicknell, Bull. Torrey Bot. Club 25: 104. pl. 328. 1898. Van Cortlandt Park, New York City [*Bicknell* in 1897].
Hierochloë nashii Kaczmarek, Amer. Midl. Nat. 3: 198. 1914. Based on *Savastana nashii* Bicknell.
Torresia odorata Hitchc., Amer. Jour. Bot. 2: 301. 1915. Based on *Holcus odoratus* L.
Savastana odorata var. *fragrans* Farwell, Mich. Acad. Sci. Rept. 21: 350. 1920. Based on *Holcus fragrans* Willd.
Torresia nashii House, N.Y. State Mus. Bull. 243–244: 58. 1923. Based on *Savastana nashii* Bicknell.

(88) HILARIA H.B.K.

(1) **Hilaria belangeri** (Steud.) Nash, N.Amer. Fl. 17: 135. 1912. Based on *Anthephora belangeri* Steud.

Anthephora belangeri Steud., Syn. Pl. Glum. 1: 111. 1854. "Mexico, *Belanger* 1428." Belanger is evidently an error for Berlandier, since *Berlandier* 1428 collected between Laredo and Bejar [Bexar], now Texas, agrees with the description. Belanger collected in India.

Schleropelta stolonifera Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 1. 1866. Northwestern Texas.

Hilaria cenchroides var. *texana* Vasey, Contrib. U.S. Natl. Herb. 1: 53. 1890. Pena, Duval County, Tex., *Nealley* [600].

Hilaria texana Nash, in Small, Fl. Southeast. U.S. 68. 1903. Based on *Hilaria cenchroides* var. *texana* Vasey.

HILARIA BELANGERI var. LONGIFOLIA (Vasey) Hitchc., Biol. Soc. Wash. Proc. 41: 162. 1928. Based on *H. cenchroides* var. *longifolia* Vasey. (Published as *H. belangeri longifolia*.)

Hilaria cenchroides var. *longifolia* Vasey; Amer. Acad. Sci. Proc. 24: 80. 1889, name only; Beal, Grasses N.Amer. 2: 69. 1896. Islands in Guaymas harbor, Mexico, *Palmer* 347 in 1887.

(3) **Hilaria jamesii** (Torr.) Benth., Jour. Linn. Soc. Bot. 19: 62. 1881. Based on *Pleuraphis jamesii* Torr.

Pleuraphis jamesii Torr., Ann. Lyc. N.Y. 1: 148. pl. 10. 1824. Sources of the Canadian River [Texas or New Mexico], *James*.

Hilaria sericea Benth., Jour. Linn. Soc. Bot. 19: 62. 1881. Name only.

Pleuraphis sericea Nutt.; Benth., Jour. Linn. Soc. Bot. 19: 62. 1881, as synonym of *Hilaria sericea* Benth. [Harris Fork of the Colorado, *Nuttall*.]

(2) **Hilaria mutica** (Buckl.) Benth., Jour. Linn. Soc. Bot. 19: 62. 1881. Based on *Pleuraphis mutica* Buckl.

Pleuraphis mutica Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1863. Northern Texas [*Wright* 760–2108].

(4) **Hilaria rigida** (Thurb.) Benth.; Scribn., Bull. Torrey Bot. Club 9: 86. 1882. Based on *Pleuraphis rigida* Thurb.

Pleuraphis rigida Thurb., in S. Wats., Bot. Calif. 2: 293. 1880. California, Fort Mojave and Providence Mountains, *Cooper* [2230, the type]; Fort Yuma, *Thomas;* Colorado Desert, *Schott*.

(59) HOLCUS L.

(1) **Holcus lanatus** L., Sp. Pl. 1048. 1753. Europe.

Aira holcus-lanata Vill., Hist. Pl. Dauph. 2: 87. 1787. Based on *Holcus lanatus* L.

Avena pallida Salisb., Prodr. Stirp. 24. 1796. Not *A. pallida* Thunb. 1794. Based on *Holcus lanatus* L.

Avena lanata Koel., Descr. Gram. 300. 1802. Based on *Holcus lanatus* L. Same published by Cav., Descr. Pl. 308. 1802.

Ginannia pubescens Bubani, Fl. Pyr. 4: 321. 1901. Based on *Holcus lanatus* L.

Notholcus lanatus Nash; Hitchc., in Jepson, Fl. Calif. 1: 126. 1912. Based on *Holcus lanatus* L.

Nothoholcus lanatus Nash, in Britt. and Brown, Illustr. Fl. ed. 2. 1: 214. 1913. Based on *Holcus lanatus* L.

Ginannia lanata F. T. Hubb., Rhodora 18: 234. 1916. Based on *Holcus lanatus* L.

(2) **Holcus mollis** L. Syst., Nat. ed. 10. 2: 1305. 1759. Europe.

Aira mollis Schreb., Spic. Fl. Lips. 51. 1771. Based on *Holcus mollis* L.

Aira holcus-mollis Vill., Hist. Pl. Dauph. 2: 88. 1787. Based on *Holcus mollis* L.

Avena sylvatica Salisb., Prodr. Stirp. 24. 1796. Based on *Holcus mollis* L.

Avena mollis Koel., Descr. Gram. 300. 1802. Not *A. mollis* Salisb., 1796. Based on *Holcus mollis* L.

Ginannia mollis Bubani, Fl. Pyr. 4: 321. 1901. Based on *Holcus mollis* L.

Notholcus mollis Hitchc., Amer. Jour. Bot. 2: 304. 1915. Based on *Holcus mollis* L.

(46) HORDEUM L.

(6) **Hordeum adscendens** H.B.K., Nov. Gen. and Sp. 1: 280. 1816. Near Mexico City, *Humboldt* and *Bonpland*.

Hordeum distichon L., Sp. Pl. 85. 1753. Cultivated.

(5) **Hordeum gussonianum** Parl., Fl. Palerm. 1: 246. 1845. Italy.

Hordeum maritimum var. *gussonianum* Richt., Pl. Eur. 1: 131. 1890. Based on *H. gussonianum* Parl.

Hordeum nodosum depressum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 24. 1897. [Type, Lexington, Oreg., *Leiberg* 39.]

Hordeum marinum subsp. *gussonianum* Thell., Vierteljahrs. Nat. Ges. Zürich 52: 441. 1908. Based on *H. gussonianum* Parl.

Hordeum depressum Rydb., Bull. Torrey Bot. Club 36: 539. 1909. Based on *H. nodosum depressum* Scribn. and Smith.

Hordeum hexastichon L., Sp. Pl. 85. 1753. Cultivated.

(2) **Hordeum jubatum** L., Sp. Pl. 85. 1753. Canada, *Kalm.*

?*Critesion geniculatum* Raf., Jour. Phys. Chym. 89: 103. 1819. Illinois.

?*Elymus jubatus* Link, Hort. Berol. 1: 19. 1827. Garden specimen, *Hordeum jubatum* L., doubtfully cited as synonym.

HORDEUM JUBATUM var. CAESPITOSUM (Scribn.) Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *H. caespitosum* Scribn. (Published as *H. jubatum cacspitosum.*)

Hordeum caespitosum Scribn., Davenport Acad. Sci. Proc. 7: 245. 1899. Edgemont, S.Dak., *Pammel* 143; Geranium Park, Wyo., *Pammel* 157 [type].

Hordeum marinum Huds., Fl. Angl. ed. 2. 57. 1778. England.

Hordeum maritimum With., Bot. Arr. Veg. Brit. ed. 2. 1: 127. 1787. Based on *H. marinum* Huds.

(1) **Hordeum montanense** Scribn.; Beal, Grasses N.Amer. 2: 644. 1896. Montana, *Scribner* 429, 430.

Hordeum pammeli Scribn. and Ball, Iowa Geol. Survey Sup. Rept. 1903: 335. 1905. Dakota City, Iowa, *Pammel* 3824.

(7) **Hordeum murinum** L., Sp. Pl. 85. 1753. Europe.

Triticum murale Salisb., Prodr. Stirp. 27. 1796. Based on *Hordeum murinum* L.

Zeocriton murinum Beauv., Ess. Agrost. 115, 182. 1812. Based on *Hordeum murinum* L.

(3) **Hordeum nodosum** L., Sp. Pl. ed. 2. 1: 126. 1762. Europe.

Hordeum pratense Huds., Fl. Angl. ed. 2. 56. 1778. England.

Zeocriton nodosum Beauv., Ess. Agrost. 115, 165, 182. 1812. Based on *Hordeum nodosum* L.

Hordeum pratense var. *nodosum* Griseb., in Ledeb., Fl. Ross. 4: 329. 1853. Based on *H. nodosum* L.

HORDEUM NODOSUM var. BOREALE (Scribn. and Smith) Hitchc., Amer. Jour. Bot. 21: 134. 1934. Based on *H. boreale* Scribn. and Smith.

Hordeum boreale Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 24. 1897. Aleutian Islands [type, Atka Island, *Turner* 1193] and Alaska to California.

(4) **Hordeum pusillum** Nutt., Gen. Pl. 1: 87. 1818. Plains of the Missouri, [*Nuttall*].

Hordeum riehlii Steud., Syn. Pl. Glum. 1: 353. 1854. St. Louis, Mo., *Riehl* 181.

HORDEUM PUSILLUM var. PUBENS Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. La Verkin, Utah, *Jones* 5196W.

Hordeum spontaneum C. Koch, Linnaea 21: 430. 1848. Caucasus.

(8) **Hordeum vulgare** L., Sp. Pl. 84. 1753. Cultivated in Europe.

Hordeum sativum Pers., Syn. Pl. 1: 108. 1805, as synonym of *H. vulgare* L.

Hordeum polystichum var. *vulgare* Doell, Rhein. Fl. 67. 1843. Based on *H. vulgare* L.

Hordeum sativum var. *vulgare* Richt., Pl. Eur. 1: 130. 1890. Based on *H. vulgare* L.

HORDEUM VULGARE var. TRIFURCATUM (Schlecht.) Alefeld, Landw. Fl. 341. 1866. Based on *H. trifurcatum* Jess. (probably error for Wender.).

Hordeum cocleste var. *trifurcatum* Schlecht., Linnaea 11: 543. 1837. Cultivated at Halle, seed from Montpellier.

Hordeum trifurcatum Wender., Flora 26: 233. 1843. Cultivated in Marburg, Germany.

(116) HYDROCHLOA Beauv.

(1) **Hydrochloa caroliniensis** Beauv., Ess. Agrost. 135, 165, 182. pl. 3. f. 18; pl. 24. f. 4. 1812. No specific description except explanation of figures. "*Zizania natans* Mich." (an unpublished name) is cited under the genus, and *Z. fluitans* Michx. is referred in the index to *Hydrochloa*. The name for pl. 3. f. 18 is given as *H. caroliniana*.

Zizania fluitans Michx., Fl. Bor. Amer. 1: 75. 1803. Not *Hydrochloa fluitans* Hartm., 1819. The published locality, Lake Champlain, is an error. The type specimen indicates Charleston, S.C., *Michaux*.

Zizania natans Michx.; Beauv., Ess. Agrost. 136. 1812, name only; Bosc, in Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3[1]: 186. 1840, as synonym of *Hydrochloa caroliniensis* Beauv. The name is misspelled *Zizania nutans* in Steud., Nom. Bot. ed. 2. 2: 799. 1841.

Luziola caroliniensis Raspail, Ann. Sci. Nat., Bot. 5: 304. 1825. Based on *Hydrochloa caroliniensis* Beauv.

Hydrochloa fluitans Torr., Comp. Fl. North. Mid. States 354, 403. 1826. Not *H. fluitans* Hartm., 1819. Based on *Zizania fluitans* Michx.

Hydropyrum fluitans Kunth, Rév. Gram. 1: 7. 1829. Based on *Zizania fluitans* Michx.

Luziola caroliniana Trin.; Steud., Nom. Bot. ed. 2. 2: 79. 1841. Based on *Zizania natans* Bosc.

(146) HYPARRHENIA Anderss.

Hyparrhenia hirta (L.) Stapf, in Prain, Fl. Trop. Afr. 9: 315. 1918. Based on *Andropogon hirtus* L.

Andropogon hirtus L., Sp. Pl. 1046. 1753. Southern Europe and Asia Minor.

Trachypogon hirtus Nees, Agrost. Bras. 346. 1829. Based on *Andropogon hirtus* L.

Sorghum hirtum Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon hirtus* L.

(1) **Hyparrhenia rufa** (Nees) Stapf, in Prain, Fl. Trop. Afr. 9: 304. 1918. Based on *Trachypogon rufus* Nees.

Trachypogon rufus Nees, Agrost. Bras. 345. 1829. Piauhy, Brazil, *Martius*.

Andropogon rufus Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Based on *Trachypogon rufus* Nees.

Sorghum rufum Kuntze, Rev. Gen. Pl. 2: 792. 1891. Based on *Andropogon rufus* Kunth.

Cymbopogon rufus Rendle, Cat. Afr. Pl. Welw. 2: 155. 1899. Based on *Andropogon rufus* Kunth.

(45) HYSTRIX Moench

(2) **Hystrix californica** (Boland.) Kuntze, Rev. Gen. Pl. 2: 778. 1891. Based on *Gymnostichum californicum* Boland.

Gymnostichum californicum Boland.; Thurb., in S. Wats., Bot. Calif. 2: 327. 1880. Near San Francisco, *Bolander*; Sausalito, *Kellogg* and *Harford* 1107.

Asperella californica Beal, Grasses N.Amer. 2: 657. 1896. Based on *Gymnostichum californicum* Boland.

Asprella californica Benth.; Beal, Grasses N.Amer. 2: 657. 1896, as synonym of *Asperella californica*.

(1) **Hystrix patula** Moench, Meth. Pl. 295. 1794. Based on *Elymus hystrix* L.

Elymus hystrix L., Sp. Pl. 560. 1753. [Virginia, *Clayton*.]

Asperella hystrix Humb.; Mag. Bot. Roem. and Ust. 7: 5. 1790. Based on *Elymus hystrix* L.

Asprella hystrix Willd., Enum. Pl. 132. 1809. Based on *Elymus hystrix* L.

Gymnostichum hystrix Schreb., Beschr. Gräs. 2: 127. pl. 47. 1810. Based on *Elymus hystrix* L.

Zeocriton hystrix Beauv., Ess. Agrost. 115, 182. 1812. Presumably based on *Elymus hystrix* L.

Asperella echidnea Raf., Amer. Monthly Mag. 4: 190. 1819. Based on *Elymus hystrix* L.

Elymus pseudohystrix Schult., Mant. 2: 427. 1824. Based on "*Elymus hystrix* Nutt." (error for L., Nuttall applying the Linnaean name correctly).

Asprella americana Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 151. 1837. Arkansas, *Nuttall*.

Asprella angustifolia Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 151. 1837. Arkansas, *Nuttall.*
Asprella major Fres.; Steud., Nom. Bot. ed. 2. 1: 152. 1840, as synonym of *Elymus hystrix* L.
Hystrix hystrix Millsp., Fl. W.Va. 474. 1892. Based on *Elymus hystrix* L.
Hystrix elymoides Mackenz. and Bush, Man. Fl. Jackson County 39. 1902. Based on *Elymus hystrix* L.
Hordeum hystrix Schenck, Bot. Jahrb. Engler 40: 109. 1907. Not *H. hystrix* Roth, 1797. Based on *Elymus hystrix* L.
Gymnostichum patulum Lunell, Amer. Midl. Nat. 4: 228. 1915. Based on *Hystrix patula* Moench.
Asperella hystrix var. *bigeloviana* Fernald, Rhodora 24: 230. 1922. Hanover, Conn., *Williams* in 1910.
Hystrix patula var. *bigeloviana* Deam, Ind. Dept. Conserv. Pub. 82: 117. 1929. Based on *Asperella hystrix* var. *bigeloviana* Fernald.

(140) IMPERATA Cyrillo

(1) **Imperata brasiliensis** Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 331. 1832. Brazil.
Imperata brasiliensis var. *mexicana* Rupr., Bull. Acad. Sci. Brux. 9^2: 245. 1842. Name only. Mexico, *Galeotti* 5678.
Imperata arundinacea var. *americana* Anderss., Öfv. Svensk. Vet. Akad. Förh. 12: 160. 1855. British Guiana, *Schomburgk* 665; Mexico, *Galeotti* 5678; Chile, *D'Urville.*
This is the species described as *Imperata caudata* Cyrillo, in Chapm., Fl. South. U.S. ed. 2. 668. 1883.
Imperata cylindrica (L.) Beauv., Ess. Agrost. 8, 165, 166, 177. pl. 5. f. 1. 1812. Based on *Lagurus cylindricus* L.
Lagurus cylindricus L., Syst. Nat. ed. 10. 2: 878. 1759. Europe.
Saccharum cylindricum Lam., Encycl. 1: 594. 1783. Based on *Lagurus cylindricus* L.
Imperata arundinacea Cyrillo, Pl. Rar. Neap. 2: 27. pl. 11. 1788. Italy.
(2) **Imperata hookeri** Rupr.; Anderss., Öfv. Svensk. Vet. Akad. Förh. 12: 160. 1855. Texas, *Drummond* II. 283.
Imperata brevifolia Vasey, Bull. Torrey Bot. Club 13: 26. 1886. Southern California, *Parish* 1031 [type]; New Mexico, *Wright* 2001.

(52) KOELERIA Pers.

(1) **Koeleria cristata** (L.) Pers., Syn. Pl. 1: 97. 1805. "*Poa cristata* auctorum", presumably *Poa cristata* L., used by Willd. (Sp. Pl. 1: 402. 1797), Lamarck (Tabl. Encycl. 1: 182. 1791), and others.
Aira cristata L., Sp. Pl. 63. 1753. Europe.
Poa cristata L., Syst. Nat. ed. 12. 94. 1767. Based on *Aira cristata* L.
Festuca cristata Vill., Hist. Pl. Dauph. 1: 250. 1786. Not *F. cristata* L., 1753. Based on *Aira cristata* L.
Koeleria gracilis Pers., Syn. Pl. 1: 97. 1805. Europe.
Koeleria nitida Nutt., Gen. Pl. 1: 74. 1818. Plains of the Missouri.
Aira gracilis Trin., Fund. Agrost. 144. 1820. Based on *Koeleria gracilis* Pers.
Airochloa cristata Link, Hort. Berol. 1: 127. 1827. Based on *Aira cristata* L. The specific name was misspelled "*aristata*" in Link, Handb. Gewächs. 1: 64. 1829.
Airochloa gracilis Link, Hort. Berol. 2: 276. 1827. Based on *Koeleria gracilis* Pers.
Koeleria cristata var. *nuttali* Wood, Class-book ed. 2. 613. 1847. Presumably based on *K. nitida* Nutt.
Koeleria cristata var. *gracilis* A. Gray, Man. 591. 1848. No definite locality cited. Presumably based on *K. gracilis* Pers.
Brachystylus cristatus Dulac, Fl. Haut. Pyr. 85. 1867. Based on *Koeleria cristata* Pers.
Koeleria nitida var. *arkansana* Scribn., Kans. Acad. Sci. Trans. 9: 118. 1885. [Arkansas.]
Koeleria arkansana Nutt.; Scribn., Kans. Acad. Sci. Trans. 9: 118. 1885. [Arkansas, *Nuttall*], as synonym of *K. nitida* var. *arkansana.*
Achaeta geniculata Fourn., Mex. Pl. 2: 109. 1886. Mexico, *Liebmann* 609.
Koeleria cristata var. *major* Vasey in Macoun, Cat. Can. Pl. 2^4: 218. 1888. Not *K. cristata* var. *major* Koch, 1837. Name only, for *Macoun*, Vancouver Island.

Koeleria cristata var. *pubescens* Vasey; Davy, in Jepson, Fl. West. Mid. Calif. 61. 1901. Not *K. cristata* var. *pubescens* Mutel, 1837. San Francisco, Calif., *Michener* and *Bioletti.*

Koeleria cristata var. *longifolia* Vasey; Davy, in Jepson, Fl. West. Mid. Calif. 61. 1901. Santa Cruz County, Calif., *Anderson.*

Koeleria cristata pinetorum Abrams, Fl. Los Angeles 46. 1904. Based on *K. cristata* var. *pubescens* Vasey.

Koeleria pseudocristata var. *californica* Domin, Magyar Bot. Lapok 3: 264. 1904. San Diego, Calif., *Pringle* in 1882.

Koeleria elegantula Domin, Bibl. Bot. 65: 172. 1907. Gunnison, Colo., *Baker* 578.

Koeleria robinsoniana Domin, Bibl. Bot. 65: 172. 1907. Wenatchee, Wash., *Whited* 1131.

Koeleria robinsoniana var. *australis* Domin, Bibl. Bot. 65: 172. 1907. Blalocks, Oreg., *Leckenby* 28 in 1900.

Koeleria gracilis var. *dasyclada* Domin, Bibl. Bot. 65: 211. 1907. California, *Lemmon* in 1882.

Koeleria pseudocristata Domin, Bibl. Bot. 65: 222. 1907. With two American forms: *densevestita*, California, *Hall* 2206; *laxa*, California, *Heller* 7443.

Koeleria pseudocristata var. *longifolia* Domin, Bibl. Bot. 65: 224. 1907. California, *Nuttall.*

Koeleria pseudocristata var. *oregana* Domin, Bibl. Bot. 65: 224. 1907. Oregon, *Nuttall.*

Koeleria pseudocristata var. *pseudonitida* Domin, Bibl. Bot. 65: 224. 1907. Wyoming, *Nelson* 273.

Koeleria polyantha var. *californiensis* Domin, Bibl. Bot. 65: 226. 1907. San Jacinto Mountains, Calif., *Hall* 2131.

Koeleria nitida var. *missouriana* Domin, Bibl. Bot. 65: 233. 1907. St. Louis, *Riehl* 44; Courtney, Mo., *Bush* 773.

Koeleria nitida var. *californica* Domin, Bibl. Bot. 65: 233. 1907. Based on *K. pseudocristata* var. *californica* Domin. With three subvarieties from California: *transiens*, *Brandegee* 3678; *multiflora*, *Parish Brothers* 855; *vestita*, *Palmer* 405.

Koeleria nitida var. *sublanuginosa* Domin, Bibl. Bot. 65: 234. 1907. Miranda, S.Dak., *Griffiths* 235. With subvar. *pubiflora*, Washington, *Lyall* in 1860.

Koeleria nitida var. *laxa* Domin, Bibl. Bot. 65: 235. 1907. Arizona, *Palmer* in 1890; New Mexico, *Metcalfe.*

Koeleria nitida var. *subrepens* Domin, Bibl. Bot. 65: 235. 1907. Arboles, Colo., *Baker* 185.

Koeleria nitida var. *munita* Domin, Bibl. Bot. 65: 235. 1907. Montana, *Rydberg* 3294.

Koeleria nitida var. *latifrons* Domin, Bibl. Bot. 65: 236. 1907. Nebraska, *Rydberg.*

Koeleria nitida var. *breviculmis* Domin, Bibl. Bot. 65: 236. 1907. Colorado, *Baker*, *Earle*, and *Tracy* 114.

Koeleria nitida var. *caudata* Domin, Bibl. Bot. 65: 236. 1907. Wisconsin, *Kumlien* 99.

Koeleria idahoensis Domin, Bibl. Bot. 65: 237. 1907. Lewiston, Idaho, *Heller* 309 (error for 3091).

Koeleria idahoensis var. *pseudocristatoides* Domin, Bibl. Bot. 65: 238. 1907. Nez Perce County, Idaho, *Heller* 3291.

Koeleria macrura Domin, Bibl. Bot. 65: 238. 1907. With three forms: *quadriflora*, Arizona, *Nealley* in 1891; *triflora*, Organ Mountains, N.Mex., *Wooton* 110; *biflora*, Chiricahua Mountains, Ariz., *Toumey* in 1896.

Koeleria latifrons Rydb., Brittonia 1: 84. 1931. Based on *K. nitida* var. *latifrons* Domin.

(2) **Koeleria phleoides** (Vill.) Pers., Syn. Pl. 1: 97. 1805. Based on *Festuca phleoides* Vill.

Festuca phleoides Vill., Fl. Delph. 7. 1785. Europe.

Koeleria brachystachys DC., Cat. Hort. Monsp. 120. 1813. Europe.

Lophochloa phleoides Reichenb., Fl. Germ. 42. 1830. Based on *Festuca phleoides* Vill.

(74) LAGURUS L.

(1) **Lagurus ovatus** L., Sp. Pl. 81. 1753. Southern Europe.

(23) LAMARCKIA Moench

(1) **Lamarckia aurea** (L.) Moench, Meth. Pl. 201. 1794. Based on *Cynosurus aureus* L.
Cynosurus aureus L., Sp. Pl. 73. 1753. Europe.
Chrysurus cynosuroides Pers., Syn. Pl. 1: 80. 1805. Based on *Cynosurus aureus* L.
Chrysurus aureus Beauv.; Spreng., Syst. Veg. 1: 296. 1825. Based on *Cynosurus aureus* L.
Achyrodes aureum Kuntze, Rev. Gen. Pl. 2: 758. 1891. Based on *Cynosurus aureus* L.

(130) LASIACIS (Griseb.) Hitchc.

(i) **Lasiacis divaricata** (L.) Hitchc., Contrib. U.S. Natl. Herb. 15: 16. 1910. Based on *Panicum divaricatum* L.
Panicum divaricatum L., Syst. Nat. ed. 10. 2: 871. 1759. Jamaica, *Browne.*
Panicum bambusioides Desv.; Hamilt., Prodr. Pl. Ind. Occ. 10. 1825. Puerto Rico.
Panicum chauvinii Steud., Syn. Pl. Glum. 1: 68. 1854. Guadeloupe, *Duchaissing.*
Panicum divaricatum var. *stenostachyum* Griseb., Fl. Brit. W. Ind. 551. 1864. Jamaica, Alexander, *Wilson, March* [type].

(112) LEERSIA Swartz

(4) **Leersia hexandra** Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, *Swartz.*
Asprella hexandra Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia hexandra* Swartz.
Leersia mexicana H.B.K., Nov. Gen. and Sp. 1: 195. 1816. Mexico, *Humboldt* and *Bonpland.*
Asprella mexicana Roem. and Schult., Syst. Veg. 2: 267. 1817. Based on *Leersia mexicana* H.B.K.
Leersia contracta Nees, Agrost. Bras. 516. 1829. Brazil, *Sellow.*
Leersia elongata Willd.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^1: 172. 1840, as synonym of *L. mexicana* H.B.K.
Oryza hexandra Doell, in Mart., Fl. Bras. 2^2: 10. 1871. Based on *Leersia hexandra* Swartz.
Oryza mexicana Doell, in Mart., Fl. Bras. 2^2: 10. 1871. Based on *Leersia mexicana* H.B.K.
Leersia gouinii Fourn., Mex. Pl. 2: 2. 1886. Vera Cruz, Mexico, *Gouin.*
Homalocenchrus gouinii Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia gouinii* Fourn.
Homalocenchrus hexandrus Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia hexandra* Swartz.
Leersia dubia Areschoug, Svensk Freg. Eugenies Resa 1910: 115. 1910. Ecuador, *Andersson.*
(1) **Leersia lenticularis** Michx., Fl. Bor. Amer. 1: 39. 1803. Illinois, *Michaux.*
Asprella lenticularis Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia lenticularis* Michx.
Zizania lenticularis Michx.; Beauv., Ess. Agrost. 182. 1812. Name only, doubtless error for *Leersia lenticularis* Michx.
Leersia ovata Poir., in Lam., Encycl. Sup. 3: 329. 1813. North America.
Asprella ovata Roem. and Schult. Syst. Veg. 2: 267. 1817. Based on *Leersia ovata* Poir.
Homalocenchrus lenticularis Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia lenticularis* Michx.
Homalocenchrus ovata Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia ovata* Poir.
Endodia lenticularis Raf.; Jacks., Ind. Kew. 2: 840. 1893, as synonym of *Leersia lenticularis* Michx.
(5) **Leersia monandra** Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, *Swartz.*
Asprella monandra Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia monandra* Swartz.

Paspalum cubense Spreng., Neu. Entd. 3: 12. 1822. Cuba and neighboring islands.
Oryza monandra Doell, in Mart., Fl. Bras. 2^2: 9. 1871. Based on *Leersia monandra* Swartz.
Homalocenchrus monandrus Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Leersia monandra* Swartz.

(2) **Leersia oryzoides** (L.) Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Based on *Phalaris oryzoides* L.
Phalaris oryzoides L., Sp. Pl. 55. 1753. Virginia.
Homalocenchrus oryzoides Poll., Hist. Pl. Palat. 1: 52. 1776. Based on *Phalaris oryzoides* L.
Ehrhartia clandestina Web., Prim. Fl. Hols. 64. 1780. Based on *Phalaris oryzoides* L.
Asperella oryzoides Lam., Tabl. Encycl. 1: 167. 1791. Based on *Phalaris oryzoides* L.
Asprella oryzoides Beauv., Ess. Agrost. 2, 153. pl. 4. f. 2. 1812. Based on *Phalaris oryzoides* L.
Leersia asperrima Willd.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^1: 171. 1840, as synonym of *L. oryzoides* Swartz.
Oryza clandestina A. Br., in Aschers., Fl. Brand. 799. 1864. Based on *Ehrhartia clandestina* Web.
Laertia oryzoides Gromow., in Trautv., Act. Hort. Petrop. 9: 354. 1884. Error for *Leersia oryzoides* Swartz.
Oryza clandestina forma *inclusa* Wiesb., in Baenitz., Deut. Bot. Monatsschr. 15: 19. 1897. Hungary.
Leersia oryzoides forma *glabra* A. A. Eaton, Rhodora 5: 118. 1903. Newburyport, Mass.
Oryza oryzoides Dalla Torre and Sarnth. Fl. Tirol 6: 142. 1906. Based on *Phalaris oryzoides* L.
Leersia oryzoides forma *inclusa* Dörfl., Herb. Norm. Sched. Cent. 55-56. 164. 1915. Based on *Oryza clandestina* forma *inclusa* Wiesb. (Published as new, Fogg, Rhodora 30: 84. 1928, same basis.)

(3) **Leersia virginica** Willd., Sp. Pl. 1: 325. 1797. North America.
Asprella virginica Beauv., Ess. Agrost. 2, 153. 1812. Based on *Leersia virginica* Willd.
Leersia imbricata Poir., in Lam., Encycl. Sup. 3: 329. 1813. Carolina, *Bosc.*
Asprella imbricata Roem. and Schult., Syst. Veg. 2: 268. 1817. Based on *Leersia imbricata* Poir.
Leersia virgata Raf., Bull. Bot. Seringe 1: 220. 1830 [probably error for *L. virginica*]. Cited as type of the genus *Aplexia*, but the name not transferred.
Homalocenchrus virginicus Britton, N.Y. Acad. Sci. Trans. 9: 14. 1889. Based on *Leersia virginica* Willd.
Aplexia virgata Raf.; Jacks., Ind. Kew. 1: 162. 1893, as synonym of *Leersia virginica.*
Aplexia virginica Raf.; Jacks., Ind. Kew. 1: 162. 1893, as synonym of *Leersia virginica.*

(90) LEPTOCHLOA Beauv.

(2) **Leptochloa chloridiformis** (Hack.) Parodi, Physis 4: 184. 1918. Based on *Diplachne chloridiformis* Hack.
Diplachne chloridiformis Hack., in Stuck., An. Mus. Nac. Buenos Aires 13: 498. 1906. Prov. Córdoba, Argentina, *Stuckert* 2329.

(4) **Leptochloa domingensis** (Jacq.) Trin., Fund. Agrost. 133. 1820. Based on *Cynosurus domingensis* Jacq.
Cynosurus domingensis Jacq., Misc. Austr. 2: 363. 1781. Dominican Republic.
Festuca domingensis Lam., Tabl. Encycl. 1: 189. 1791. Based on *Cynosurus domingensis* Jacq.
Eleusine domingensis Pers., Syn. Pl. 1: 87. 1805. Based on *Cynosurus domingensis* Jacq.
Rabdochloa domingensis Beauv., Ess. Agrost. 84, 176. 1812. Based on *Cynosurus domingensis* Jacq.
Leptostachys domingensis G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Eleusine domingensis* Pers.
Cynodon domingense Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Rabdochloa domingensis* Beauv.

Leptochloa virgata var. *domingensis* Link; Griseb., Fl. Brit. W. Ind. 538. 1864. Based on *L. domingensis* Link (same as *L. domingensis* Trin.).
Diplachne domingensis Chapm., Fl. South. U.S. ed. 3. 609. 1897. Based on *Leptochloa domingensis* Link (same as *L. domingensis* Trin.).

(1) **Leptochloa dubia** (H.B.K.) Nees, Syll. Pl. Ratisb. 1: 4. 1824. Based on *Chloris dubia* H.B.K.
Chloris dubia H.B.K., Nov. Gen. and Sp. 1: 169. 1816. Mexico, *Humboldt* and *Bonpland.*
Leptostachys dubia G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Chloris dubia* H.B.K.
Festuca obtusiflora Willd.; Spreng., Syst. Veg. 1: 356. 1825. Mexico.
Schismus patens Presl, Rel. Haenk. 1: 269. 1830. Chile, *Haenke.*
Leptochloa patens Kunth, Rév. Gram. 1: Sup. XXII. 1830. Based on *Schismus patens* Presl.
Leptochloa obtusiflora Trin.; Steud., Nom. Bot. ed. 2. 2: 30. 1841, as synonym of *L. dubia* Nees.
Diplachne patens Desv., in Gay, Fl. Chil. 6: 371. 1853. Based on *Schismus patens* Presl.
Uralepis brevicuspidata Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 93. 1863. Texas, [*Wright* 767].
Ipnum mendocinum R. A. Phil., An. Univ. Chile 36: 211. 1870. Mendoza. Argentina.
Diplachne dubia Scribn., Bull. Torrey Bot. Club 10: 30. 1883. Based on *Leptochloa dubia* Nees.
Molinia retusa Griseb.; Fourn., Mex. Pl. 2: 147. 1886, as synonym of *Leptochloa dubia* Nees.
Diplachne dubia var. *aristata* Vasey, Calif. Acad. Sci. Proc. II. 2: 213. 1889. Name only. Baja California, *Brandegee.*
Leptochloa pringlei Beal, Grasses N.Amer. 2: 436. 1896. Arizona, *Pringle* in 1884.
Diplachne pringlei Vasey; Beal, Grasses N.Amer. 2: 436. 1896, as synonym of *Leptochloa pringlei.*
Diplachne mendocina Kurtz, Bol. Acad. Cienc. Córdoba 15: 521. 1897. Based on *Ipnum mendocinum* R. A. Phil.
Diplachne dubia var. *pringleana* Kuntze, Rev. Gen. Pl. 3^2: 349. 1898. Chihuahua, Mexico, *Pringle* 422.
Diplachne dubia var. *humboldtiana* Kuntze, Rev. Gen. Pl. 3^2: 349. 1898. Presumably the original form collected by *Humboldt* and *Bonpland.*
Leptochola dubia pringleana Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 24: 27. 1901. Based on *Diplachne dubia* var. *pringleana* Kuntze.
Rabdochola dubia Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 121. 1904. Based on *Leptochloa dubia* Nees.
Sieglingia dubia Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 128. 1904. Based on *Chloris dubia* H.B.K.
Eragrostis mendozina Jedw., Bot. Archiv Mez 5: 192. 1924. Based on *Ipnum mendocinum* Phil.

(7) **Leptochloa fascicularis** (Lam.) A. Gray, Man. 588. 1848. Based on *Festuca fascicularis* Lam.
Festuca fascicularis Lam., Tabl. Encycl. 1: 189. 1791. South America.
Festuca polystachya Michx., Fl. Bor. Amer. 1: 66. 1803. Illinois, *Michaux.*
Diplachne fascicularis Beauv., Ess. Agrost. 81, 160. pl. 16. f. 9. 1812. Based on *Festuca fascicularis* Lam.
Festuca procumbens Muhl., Descr. Gram. 160. 1817. Carolina.
Festuca clandestina Muhl., Descr. Gram. 162. 1817. New York.
Festuca aquatica Bosc; Roem. and Schult., Syst. Veg. 2: 615. 1817, as synonym of *Diplachne fascicularis* Beauv.
Cynodon fascicularis Raspail, Ann. Sci. Nat. Bot. 5: 303. 1825. Based on *Diplachne fascicularis* Beauv.
Leptochloa polystachya Kunth, Rév. Gram. 1: 91. 1829. Based on *Festuca polystachya* Michx.
Diachroa procumbens Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 147. 1837. Based on *Festuca procumbens* Muhl.
Festuca texana Steud., Syn. Pl. Glum. 1: 310. 1854. Texas, *Drummond* 387.
Uralepsis composita Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 94. 1863. New Mexico, *Woodhouse.*

Diplachne patens Fourn.; Hemsl., Biol. Centr. Amer. Bot. 3: 570. 1885, name only; Mex. Pl. 2: 148. 1886. Not *D. patens* Desv., 1853. Vera Cruz, Mexico, *Gouin* 93.

Diplachne tracyi Vasey, Bull. Torrey Bot. Club 15: 40. 1888. Reno, Nev., *Tracy* [216].

Leptochloa tracyi Beal, Grasses N.Amer. 2: 436. 1896. Based on *Diplachne tracyi* Vasey.

Festuca prostrata Muhl.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 5. 1900, as synonym of *F. procumbens* Muhl.

Diplachne procumbens Nash, in Britton, Man. 128. 1901. Not *D. procumbens* Arech., 1896. Based on *Festuca procumbens* Muhl.

Diplachne acuminata Nash, in Britton, Man. 128. 1901. Arkansas to Nebraska and Colorado. [Type, Kansas, *Thompson.*]

Diplachne maritima Bicknell, Bull. Torrey Bot. Club 35: 195. 1908. Based on *D. procumbens* Nash.

(5) **Leptochloa filiformis** (Lam.) Beauv., Ess. Agrost. 71, 161, 166. 1812. Based on *Festuca filiformis* Lam.

Festuca filiformis Lam., Tabl. Encycl. 1: 191. 1791. South America.

Eleusine mucronata Michx., Fl. Bor. Amer. 1: 65. 1803. Illinois, *Michaux.*

Eleusine filiformis Pers., Syn. Pl. 1: 87. 1805. South America.

?*Eleusine sparsa* Muhl., Descr. Gram. 135. 1817. Carolina and Georgia.

Oxydenia attenuata Nutt., Gen. Pl. 1: 76. 1818. New Orleans, La. [*Nuttall*].

Leptostachys filiformis G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Eleusine filiformis* Pers.

Leptochloa mucronata Kunth, Rév. Gram. 1: 91. 1829. Based on *Eleusine mucronata* Michx.

Aira panicea Willd.; Steud., Nom. Bot. ed. 2. 1: 45. 1840, as synonym of *Leptochloa filiformis* Beauv.

Eleusine stricta Willd.; Steud. Nom. Bot. ed. 2. 1: 549. 1840. Not *E. stricta* Roxb., 1820. As synonym of *Leptochloa filiformis* Beauv.

Eleusine elongata Willd.; Steud., Nom. Bot. ed. 2. 1: 549. 1840, as synonym of *Leptochloa filiformis* Beauv.

Leptochloa brachiata Steud., Syn. Pl. Glum. 1: 209. 1854. Guadeloupe, *Duchaissing.*

Leptochloa attenuata Steud., Syn. Pl. Glum. 1: 209. 1854. Based on *Oxydenia attenuata* Nutt.

Leptochloa pellucidula Steud., Syn. Pl. Glum. 1: 209. 1854. Panama, *Duchaissing.*

Leptochloa paniculata Fourn., Bull. Soc. Bot. France II. 27: 296. 1880. Nicaragua, *Levy* 1079.

Leptochloa mucronata pulchella Scribn., Bull. Torrey Club 9: 147. 1882. Santa Cruz Valley, Ariz., *Pringle* in 1881.

Oxydenia filiformis Nutt.; Jacks., Ind. Kew. 3: 392. 1894, as synonym of *Leptochloa filiformis.*

Leptochloa pilosa Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 32: 9. 1901. Travis County, Tex., *Bodin* 294 in 1891.

(9) **Leptochloa nealleyi** Vasey, Bull. Torrey Bot. Club 12: 7. 1885. Texas, *Nealley.*

Leptochloa stricta Fourn., Mex. Pl. 2: 147. 1886. Vera Cruz, Mexico, *Gouin* 73.

(11) **Leptochloa panicoides** (Presl) Hitchc., Amer. Jour. Bot. 21: 137. 1934. Based on *Megastachya panicoides* Presl. (Not invalidated by *L. panicoides* Wight, 1854, listed as a synonym only.)

Megastachya panicoides Presl, Rel. Haenk. 1: 283. 1830. Acapulco, Mexico, *Haenke.*

Poa panicoides Kunth, Rév. Gram. 1: Sup. XXVIII. 1830. Based on *Megastachya panicoides* Presl.

Leptochloa floribunda Doell, in Mart., Fl. Bras. 2^3: 89. 1878. Amazon River, Brazil.

Diplachne halei Nash, Bull. N.Y. Bot. Gard. 1: 292. 1899. Louisiana, *Hale.*

Leptochloa halei Scribn. and Merr. U.S.Dept.Agr., Div. Agrost. Bull. 24: 27. 1901. Based on *Diplachne halei* Nash.

(10) **Leptochloa scabra** Nees, Agrost. Bras. 435. 1829. Amazon River, Brazil.

Leptochloa langloisii Vasey, Bull. Torrey Bot. Club 12: 7. 1885. Louisiana, *Langlois.*

Leptochloa liebmanni Fourn., Mex. Pl. 2: 147. 1886. Antigua, Mexico, *Liebmann* 244, 248.

(8) **Leptochloa uninervia** (Presl) Hitchc. and Chase, Contrib. U.S. Natl. Herb. 18: 383. 1917. Based on *Megastachya uninervia* Presl.
Megastachya uninervia Presl, Rel. Haenk. 1: 283. 1830. Mexico, *Haenke.*
Poa uninervia Kunth, Rév. Gram. 1: Sup. XXVIII. 1830. Based on *Megastachya uninervia* Presl.
Diplachne verticillata Nees and Mey., Nov. Act. Acad. Caes. Leop. Carol. 19: Sup. 1: 27. 1841; 159. 1843. Chile and Peru, *Meyen.*
Uralepis verticillata Steud., Syn. Pl. Glum. 1: 248. 1854. Based on *Diplachne verticillata* Nees and Mey.
Eragrostis uninervia Steud., Syn. Pl. Glum. 1: 278. 1854. Based on *Megastachya uninervia* Presl.
Atropis carinata Griseb., Abh. Ges. Wiss. Göttingen 24: 291. 1879. Argentina.
Leptochloa imbricata Thurb., in S. Wats., Bot. Calif. 2: 293. 1880. California, Larken's Station, San Diego County, *Palmer* 404; Fort Yuma, *Thomas*; Gila Valley to Rio Grande.
Diplachne imbricata Scribn., Bull. Torrey Bot. Club 10: 30. 1883. Based on *Leptochloa imbricata* Thurb.
Brizopyrum uninervium Fourn., Mex. Pl. 2: 121. 1886. Based on *Megastachya uninervia* Presl.
Leptochloa virletii Fourn., Mex. Pl. 2: 147. 1886. San Luis Potosí, Mexico, *Virlet* 1404.
Diplachne tarapacana Phil., An. Mus. Nac. Chile. Bot. 8: 88. 1891. Tarapacá, Chile.
Rabdochloa imbricata Kuntze, Rev. Gen. Pl. 2: 788. 1891. Based on *Leptochloa imbricata* Thurb.
Diplachne carinata Hack., Bol. Acad. Cienc. Córdoba 16: 253. 1900. Based on *Atropis carinata* Griseb.
Diplachne uninervia Parodi, Univ. Nac. Buenos Aires Rev. Céntr. Estud. 18: 147. 1925. Based on *Megastachya uninervia* Presl.

(3) **Leptochloa virgata** (L.) Beauv., Ess. Agrost. 71, 161, 166. pl. 15. f. 1. 1812. Based on *Eleusine virgata* Pers., which is based on *Cynosurus virgatus* L.
Cynosurus virgatus L., Syst. Nat. ed. 10. 2: 876. 1759. Jamaica.
Festuca virgata Lam., Tabl. Encycl. 1: 189. 1791. Based on *Cynosurus virgatus* L.
Eleusine virgata Pers., Syn. Pl. 1: 87. 1805. Based on *Cynosurus virgatus* L.
Chloris poaeformis H.B.K., Nov. Gen. and Sp. 1: 169. 1816. Colombia and Ecuador, *Humboldt* and *Bonpland.*
Leptostachys virgata G. Meyer, Prim. Fl. Esseq. 74. 1818. Based on *Cynosurus virgatus* Willd. [error for L.].
Cynodon virgatus Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Leptochloa virgata* Beauv.
Eleusine unioloides Willd.; Steud., Nom. Bot. ed. 2. 1: 549. 1840, as synonym of *Leptochloa virgata* Pers.
Leptochloa mutica Steud., Syn. Pl. Glum. 1: 208. 1854. Surinam [Dutch Guiana], *Kappler* 1553.
Leptochloa virgata var. *mutica* Doell, in Mart., Fl. Bras. 2^3: 91. 1878. Based on *L. mutica* Steud.
Leptochloa virgata var. *aristata* Fourn., Mex. Pl. 2: 146. 1886. Mexico.
Leptochloa virgata var. *intermedia* Fourn., Mex. Pl. 2: 146. 1886. Mexico, *Liebmann* 243, 251.
Oxydenia virgata Nutt.; Jacks., Ind. Kew. 3: 392. 1894, as synonym of *Leptochloa virgata.*
Leptochloa perennis Hack., Inf. Est. Centr. Agron. Cuba 1: 411. 1906. Cuba, *Baker* 4617.

(6) **Leptochloa viscida** (Scribn.) Beal, Grasses N.Amer. 2: 434. 1896. Based on *Diplachne viscida* Scribn.
Diplachne viscida Scribn., Bull. Torrey Bot. Club 10: 30. 1883. Santa Cruz Valley, Tucson, Ariz., *Pringle* in 1881.

(122) LEPTOLOMA Chase

(1) **Leptoloma cognatum** (Schult.) Chase, Biol. Soc. Wash. Proc. 19: 192. 1906. Based on *Panicum cognatum* Schult.
?*Panicum nudum* Walt., Fl. Carol. 73. 1788. South Carolina. Description inadequate, no specimen in the Walter Herbarium in the British Museum.
Panicum divergens Muhl., Descr. Gram. 120. 1817. Not *P. divergens* H.B.K., 1815. South Carolina.

Panicum cognatum Schult., Mant. 2: 235. 1824. Based on *P. divergens* Muhl.
Panicum autumnale Bosc; Spreng., Syst. Veg. 1: 320. 1825. Origin unknown.
Panicum fragile Kunth, Rév. Gram. 1: 36. 1829. Based on *P. divergens* Muhl.

(48) LEPTURUS R. Br.

(1) **Lepturus cylindricus** (Willd.) Trin., Fund. Agrost. 123. 1820. Based on *Rottboellia cylindrica* Willd.
Rottboellia cylindrica Willd., Sp. Pl. 1: 464. 1797. Europe.
Ophiurus cylindricus Beauv., Ess. Agrost. 116, 168, 176. 1812. Based on *Rottboellia cylindrica* Willd.
Monerma cylindrica Coss. and Dur., Expl. Sci. Alger. 2: 214. 1867. Based on *Rottboellia cylindrica* Willd.
Lolium cylindricum Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 761. 1902. Based on *Rottboellia cylindrica* Willd.

(68) LIMNODEA L. H. Dewey

(1) **Limnodea arkansana** (Nutt.) L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 518. 1894. Based on *Greenia arkansana* Nutt.
Greenia arkansana Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 142. 1837. Red River, Ark.
Sclerachne arkansana Torr.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 274. 1841. Based on *Greenia arkansana* Nutt.
Sclerachne pilosa Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 275. 1841. Texas, *Drummond.*
Limnas arkansana Trin.; Steud., Nom. Bot. ed. 2. 2: 45. 1841. Based on *Greenia arkansana* Nutt.
Stipa demissa Steud., Syn. Pl. Glum. 1: 130. 1854. New Orleans, La., *Drummond* 465.
Muhlenbergia hirtula Steud., Syn. Pl. Glum. 1: 180. 1854. Texas, *Drummond.*
Limnas pilosa Steud., Syn. Pl. Glum. 1: 421. 1854. Based on *Sclerachne pilosa* Trin.
Thurberia arkansana Benth.; Vasey, U.S. Dept. Agr. Spec. Rept. 63: 16. 1883. Based on *Greenia arkansana* Nutt.
Thurberia pilosa Vasey, U.S. Dept. Agr. Spec. Rept. 63: 16. 1883. Based on *Sclerachne pilosa* Trin.
Limnodea arkansana pilosa Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7 (ed. 3): 139. 1900. Based on *Sclerachne pilosa* Trin.

(47) LOLIUM L.

(2) **Lolium multiflorum** Lam., Fl. Franç, 3: 621. 1778. France.
Lolium scabrum Presl, Rel. Haenk. 1: 267. 1830. Peru, *Haenke.*
Lolium italicum A. Br., Flora 17: 241. 1834. Europe.
Lolium perenne var. *italicum* Parnell, Grasses Scotl. 1[1]: 142. pl. 65. 1842. Presumably based on *L. italicum* A. Br.
Lolium perenne var. *multiflorum* Parnell, Grasses Brit. 302. pl. 140. 1845. Presumably based on *L. multiflorum* Lam.
Lolium multiflorum forma *microstachyum* Uechtritz, Jahresb. Schles. Ges. Vaterl. Cult. 1876: 334. 1880. Germany.
Lolium temulentum var. *multiflorum* Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *L. multiflorum* Lam.
Lolium multiflorum var. *italicum* Beck., Wiss. Mitt. Bosn. Herzeg. 9: 459. 1904. Based on *L. italicum* A. Br.
Lolium multiflorum var. *diminutum* Mutel, as used by Harger et al. (Conn. State Geol. Nat. Hist. Survey Bull. 48: 25. 1930) appears to be *L. multiflorum.* Mutel's variety, described from France, is uncertain.
(1) **Lolium perenne** L., Sp. Pl. 83. 1753. Europe.
Lolium brasilianum Nees, Agrost. Bras. 443. 1829. Montevideo, *Sellow.*
Lolium canadense Bernh., in Rouv., Monogr. Lolium 27. 1853. Not *L. canadense* Michx., 1817. As synonym of *L. perenne.*
Lolium perenne var. *pacyi* Sturtev., N.Y. State Agr. Expt. Sta. Rept. 1882[1]: 77. 1883. Name only, Experiment Station, Geneva, N.Y..
LOLIUM PERENNE var. CRISTATUM Pers. Syn. Pl. 1: 110. 1805. Europe.
Lolium rigidum Gaudin, Agrost. Helv. 1: 334. 1811. Switzerland.
Lolium perenne var. *rigidum* Coss. and Dur., Expl. Sci. Alger. 2: 194. 1867. Based on *L. rigidum* Gaud.

Lolium strictum Presl, Cyp. Gram. Sicul. 49. 1820. Sicily.
(4) **Lolium subulatum** Visiani, Fl. Dalm. 1: 90. pl. 3. 1842. Europe.
(3) **Lolium temulentum** L., Sp. Pl. 83. 1753. Europe.
Craepalia temulenta Schrank, Baier. Fl. 1: 382. 1789. Based on *Lolium temulentum* L.
LOLIUM TEMULENTUM var. LEPTOCHAETON A. Br., Flora 1: 252. 1834. Germany.
Lolium arvense With., Bot. Arr. Veg. Brit. ed. 3. 2: 168. 1796. Great Britain.
Lolium temulentum var. *arvense* Bab., Man. Brit. Bot. 377. 1843. Based on *L. arvense* With.

(115) LUZIOLA Juss.

(2) **Luziola bahiensis** (Steud.) Hitchc., Contrib. U.S. Natl. Herb. 12: 234. 1909. Based on *Caryochloa bahiensis* Steud.
Caryochloa bahiensis Steud., Syn. Pl. Glum. 1: 5. 1854. Bahia, Brazil.
Luziola alabamensis Chapm., Fl. South. U.S. 584. 1860. Brooklyn, Conecuh County, Ala., *Beaumont.*
Luziola longivalvula Doell, in Mart., Fl. Bras. 2^2: 17. 1871. Bahia, Brazil, *Salzmann* [type]; Minas Geraes, *Widgren*, *Regnell* III. 1376. (Misspelled *longivalvulva* but correct in index.)
Luziola striata Bal. and Poitr., Bull. Soc. Hist. Nat. Toulouse 12: 231. pl. 4. f. 2. 1878. Paraguay, *Balansa* 181.
Luziola pusilla S. Moore, Linn. Soc. Bot. Trans. II. 4: 507. pl. 37. f. 1–8. 1895. Santa Cruz, Matto Grosso, Brazil, *Moore* 760.
Luziola bahiensis var. *alabamensis* Prodoehl, Bot. Archiv Mez 1: 242. 1922. Based on *Luziola alabamensis* Chapm.
(1) **Luziola peruviana** Gmel., Syst. Nat. 2: 637. 1791. Based on a species described but not named by Jussieu, Gen. Pl. 33. 1789. Peru, *Dombey.*

(71) LYCURUS H.B.K.

(1) **Lycurus phleoides** H.B.K., Nov. Gen. and Sp. 1: 142. pl. 45. 1815. Mexico, *Humboldt* and *Bonpland.*
Pleopogon setosum Nutt., Jour. Acad. Nat. Sci. Phila. II. 1: 189. 1848. Santa Fe, N.Mex., *Gambel.*
Lycurus phleoides var. *glaucifolius* Beal, Grasses N.Amer. 2: 271. 1896. Mexico, *Pringle* 426; Texas, *Havard*, *Nealley.*

(154) MANISURIS L.

(1) **Manisuris altissimus** (Poir.) Hitchc. Jour. Wash. Acad. Sci. 24: 292. 1934. Based on *Rottboellia altissima* Poir.
Rottboellia altissima Poir. Voy. Barb. 2: 105. 1789. North Africa.
Rottboellia fasciculata Lam., Tabl. Encycl. 1: 204. 1791. North Africa.
Hemarthria fasciculata Kunth, Rév. Gram. 1: 153. 1829. Based on *Rottboellia fasciculata* Lam.
Rottboellia compressa var. *fasciculata* Hack., in DC., Monogr. Phan. 6: 286. 1889. Based on *R. fasciculata* Lam.
Manisuris fasciculata Hitchc., Amer. Jour. Bot. 2: 299. 1915. Based on *Rottboellia fasciculata* Lam.
(2) **Manisuris cylindrica** (Michx.) Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *Tripsacum cylindricum* Michx.
?*Ischaemum scariosum* Walt., Fl. Carol. 249. 1788. South Carolina.
Tripsacum cylindricum Michx., Fl. Bor. Amer. 1: 60. 1803. Florida, *Michaux.*
Rottboellia campestris Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 151. 1837. Arkansas [*Nuttall*].
Rottboellia cylindrica Torr., U.S. Rept. Expl. Miss. Pacif. 4: 159. 1857. Not *R. cylindrica* Willd., 1797. Based on *Tripsacum cylindricum* Michx.
Coelorachis cylindrica Nash, N.Amer. Fl. 17: 85. 1909. Based on *Tripsacum cylindricum* Michx.
(4) **Manisuris rugosa** (Nutt.) Kuntze, Rev. Gen. Pl. 2: 780. 1891. Based on *Rottboellia rugosa* Nutt.
Rottboellia rugosa Nutt., Gen. Pl. 1: 84. 1818. Florida, *Baldwin.*
Rottboellia corrugata Baldw., Amer. Jour. Sci. 1: 355. 1819. Camden County, Ga., *Baldwin.*
Hemarthria rugosa Kunth, Rév. Gram. 1: 153. 1829. Based on *Rottboellia rugosa* Nutt.

Rottboellia rugosa var. *chapmani* Hack., in DC., Monogr. Phan. 6: 308. 1889. Florida, *Chapman.*

Manisuris corrugata Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *Rottboellia corrugata* Baldw.

Manisuris rugosa var. *chapmani* Scribn., Mem. Torrey Bot. Club 5: 28. 1894. Based on *Rottboellia rugosa* var. *chapmani* Hack.

Manisuris chapmani Nash, in Small, Fl. Southeast. U.S. 56. 1903. Based on *Rottboellia rugosa* var. *chapmani* Hack.

Coelorachis rugosa Nash, N.Amer. Fl. 17: 86. 1909. Based on *Rottboellia rugosa* Nutt.

Coelorachis corrugata A. Camus, Ann. Soc. Linn. Lyon 68: 197. 1921. Based on *Rottboellia corrugata* Baldw.

(3) **Manisuris tessellata** (Steud.) Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 20: 20. f. 9. 1900. Based on *Rottboellia tessellata* Steud.

Rottboellia tessellata Steud., Syn. Pl. Glum. 1: 362. 1854. Louisiana, *Riehl* 60.

Rottboellia corrugata var. *areolata* Hack., in DC., Monogr. Phan. 6: 309. 1889. Mobile, Ala., *Mohr* in 1884.

Manisuris corrugata var. *areolata* Mohr, Bull. Torrey Bot. Club 24: 21. 1897. Based on *Rottboellia corrugata* var. *areolata* Hack.

Manisuris tessellata var. *areolata* Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17 (ed. 2): 9. 1901. Presumably based on *Rottboellia corrugata* var. *areolata* Hack.

Coelorachis tessellata Nash, N.Amer. Fl. 17: 86. 1909. Based on *Rottboellia tessellata* Steud.

(5) **Manisuris tuberculosa** Nash, Bull. N.Y. Bot. Gard. 1: 430. 1900. Eustis, Fla., *Nash* 1074.

Coelorachis tuberculosa Nash, N.Amer. Fl. 17: 86. 1909. Based on *Manisuris tuberculosa* Nash.

Rottboellia tuberculosa Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Manisuris tuberculosa* Nash.

(28) MELICA L.

Melica altissima L., Sp. Pl. 66. 1753. Siberia.

(2) **Melica aristata** Thurb.; Boland., Calif. Acad. Sci. Proc. 4: 103. 1870. "Number 4861 [*Bolander*] Catalogue, 1867", Clarks (now Wawona) [type]; Yosemite Valley; Shady Canyon to Summit; Bear Valley to Eureka, Calif.

Bromelica aristata Farwell, Rhodora 21: 77. 1919. Based on *Melica aristata* Thurb.

(7) **Melica bulbosa** Geyer; Port. and Coult., Syn. Fl. Colo. 149. 1874. Porter and Coulter cite Gray, Amer. Acad. Sci. Proc. 8: 409. 1872. Gray gives no description but cites *M. bulbosa* Geyer, Jour. Bot. Kew Misc. (Pl. Geyer.) 8: 19. 1856. In the latter work "Geyer no. 11, Upper Platte", is listed without description. The description by Porter and Coulter applies to this specimen as represented in the Gray Herbarium.

Melica bella Piper, U.S.Dept.Agr., Div. Agrost. Circ. 27: 10. 1900. Upper Platte, *Geyer* [11]. A new name for "*M. bulbosa* Geyer, in U.S.Dept.Agr., Div. Bot. Bull. 13: 63. pl. 63. 1893, not *M. bulbosa* Geyer, in Thurb., in S. Wats., Bot. Calif. 2: 304. 1880", the description by Porter and Coulter having been overlooked. The Thurber publication refers to *M. californica* (no. 17 of this work).

Melica bella intonsa Piper, Contrib. U.S. Natl. Herb. 11: 128. 1906. Wenas, Wash., *Griffiths* and *Cotton* 103.

(17) **Melica californica** Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 46. pl. 1. f. 6. 1885. Based on *M. poaeoides* as described by Torrey in Pacific Railroad Report (see below), the specimen cited by Torrey, in N.Y. Bot. Gard., being named "*M. californica* Scribn." in Scribner's script.

Melica poaeoides Nutt. [misapplied by] Torr., U.S. Rept. Expl. Miss. Pacif. 4: 157. 1857. Not *M. poaeoides* Nutt., 1848. Corte Madera, Calif., [*Bigelow*].

Melica bulbosa Geyer; Thurb., in S.Wats., Bot. Calif. 2: 304. 1880. Not *M. bulbosa* Geyer; Port. and Coult., 1874. Santa Inez, Calif., *Brewer* 569.

Melica longiligula Scribn. and Kearn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 225. f. 521. 1899. Southern California, *Parish Brothers* 865.

Melica ciliata L., Sp. Pl. 66. 1753. Europe.

(16) **Melica frutescens** Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 45. pl. 1. f. 15, 16. 1885. Southern California, *Parry* and *Lemmon* 401 [type, labeled by *Scribner*].

(8) **Melica fugax** Boland., Proc. Calif. Acad. 4: 104. 1870. Donner Lake, Calif., [*Bolander* and *Kellogg*].

Melica geyeri [Munro misapplied by] Thurb., in Wilkes, U.S. Expl. Exped. Bot. 17: 492. 1874. Cascade Mountains, Oreg.

Melica fugax madophylla Piper, Contrib. U.S. Natl. Herb. 11: 128. 1906. Falcon Valley, Wash., *Suksdorf* 61.

Melica macbridei Rowland, in Nels., Bot. Gaz. 54: 404. 1912. Silver City, Idaho, *Macbride* 948.

Melica fugax var. *inexpansa* Suksdorf, Werdenda 1^2: 1. 1923. Falcon Valley, Wash., *Suksdorf* 6989.

(5) **Melica geyeri** Munro; Boland., Calif. Acad. Sci. Proc. 4: 103. 1870. [Ukiah], Calif., *Bolander* 7, the specimen examined by Munro (in U.S. Nat. Herb.). The same collection was later distributed as 6119.

Glyceria bulbosa Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1863. Columbia woods, *Nuttall.*

Bromus muticus Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 335. 1863, as synonym of *Glyceria bulbosa* Buckl.

Melica poaeoides var. *bromoides* Boland., Calif. Acad. Sci. Proc. 4: 103. 1870, as synonym of *M. geyeri* Munro. *Bolander* 40 and 6119.

Melica bromoides Boland.; A. Gray, Amer. Acad. Sci. Proc. 8: 409. 1872. Based on *M. poaeoides* var. *bromoides* Boland. [*Bolander* 6119].

Melica poaeoides Boland.; Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885, as synonym of "*M. bromoides* Gray."

Melica bromoides var. *howellii* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885. Near Waldo, Oreg., *Howell* 335 in 1884.

Melica pammeli Scribn., Davenport Acad. Sci. Proc. 7: 240. 1899. Geranium Park, Wyo., *Pammel* 159.

Bromelica geyeri Farwell, Rhodora 21: 78. 1919. Based on *Melica geyeri* Munro.

Bromelica geyeri var. *howellii* Farwell, Rhodora 21: 78. 1919. Based on *Melica bromoides* var. *howellii* Scribn.

(3) **Melica harfordii** Boland., Calif. Acad. Sci. Proc. 4: 102. 1870. Santa Cruz, *Bolander* 53 [type]; Redwood, *Bolander* 6464; Yosemite Valley, and Bear Valley, both *Bolander.*

Melica harfordii var. *minor* Vasey, Bull. Torrey Bot. Club 15: 48. 1888. Siskiyou Mountains, Oreg., *Howell* in 1887.

Melica harfordii tenuior Piper, Contrib. U.S. Natl. Herb. 11: 127. 1906. Based on *M. harfordii* var. *minor* Vasey.

Bromelica harfordii Farwell, Rhodora 21: 78. 1919. Based on *Melica harfordii* Boland.

Bromelica harfordii var. *minor* Farwell, Rhodora 21: 78. 1919. Based on *Melica harfordii* var. *minor* Vasey.

Melica harfordii var. *tenuis* Suksdorf, Werdenda 1: 17. 1927. Bingen, Wash., *Suksdorf* 12018.

Melica harfordii var. *viridifolia* Suksdorf, Werdenda 1: 17. 1927. Bingen, Wash., *Suksdorf* 11686, 11777.

(15) **Melica imperfecta** Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 59. 1836. California.

Melica colpodioides Nees, Ann. Nat. Hist. 1: 283. 1838. California, *Douglas.*

Melica panicoides Nutt., Jour. Acad. Nat. Sci. Phila. II. 1: 188. 1848. Santa Barbara, Calif., *Gambel.*

Melica poaeoides Nutt., Jour. Acad. Nat. Sci. Phila. II. 1: 188. 1848. Santa Catalina Island, Calif., *Gambel.* [The type at the British Museum is labeled San Diego.]

Melica imperfecta var. *flexuosa* Boland., Calif. Acad. Sci. Proc. 4: 101. 1870. "Mariposa to Clark's" [Yosemite Valley region] Calif., *Bolander* in 1866.

Melica imperfecta var. *refracta* Thurb., in S. Wats., Bot. Calif. 2: 303. 1880. San Bernardino, Calif., *Lemmon.*

Melica imperfecta var. *minor* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 42. 1885. San Bernardino Mountains, *Parish Brothers* 856.

Melica parishii Vasey; Beal, Grasses N.Amer. 2: 500. 1896. Southern California, *Parish* 1997.

Melica imperfecta var. *pubens* Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 8. 1901. Santa Cruz Island, Calif., *Brandegee* 64.

The name is erroneously given as *Melica imperforata* Nees, in Hook. and Arn., Bot. Beechey Voy. 403. 1840. This is the species described and figured by Vasey (U.S.Dept.Agr., Div. Bot. Bull. 13^2: pl. 84. 1893) as *Poa thurberiana* Vasey, but the name is based on *Panicularia thurberiana* Kuntze.

(9) **Melica inflata** (Boland.) Vasey, Contrib. U.S. Natl. Herb. 1: 269. 1893. Based on *M. poaeoides* var. *inflata* Boland.
Melica poaeoides var. *inflata* Boland., Calif. Acad. Sci. Proc. 4: 101. 1870. Yosemite Valley, Calif., *Bolander* 6121.

(12) **Melica mutica** Walt., Fl. Carol. 78. 1788. South Carolina.
Melica glabra Michx., Fl. Bor. Amer. 1: 62. 1803. Virginia to Florida, *Michaux.*
Melica rariflora Schreb., Beschr. Gräs. 2: 157. 1810. Based on *M. glabra* Michx.
Melica diffusa Pursh, Fl. Amer. Sept. 1: 77. 1814. Virginia and Carolina.
Melica speciosa Muhl., Descr. Gram. 87. 1817. Pennsylvania.
Melica racemosa Muhl., Descr. Gram. 88. 1817. Not *M. racemosa* Thunb., 1794. Carolina; Georgia.
Melica muhlenbergiana Schult., Mant. 2: 294. 1824. Based on *M. racemosa* Muhl.
Melica mutica var. *glabra* A. Gray, Man. ed. 5. 626. 1867. Based on *M. glabra* Pursh (error for Michx.).
Melica mutica var. *diffusa* A. Gray, Man. ed. 5. 626. 1867. Based on *M. diffusa* Pursh.

(13) **Melica nitens** (Scribn.) Nutt.; Piper, Bull. Torrey Bot. Club 32: 387. 1905. Based on *M. diffusa* var. *nitens* Scribn.
Melica scabra Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 148. 1837. Not *M. scabra* H.B.K., 1816. Fort Smith, Ark., *Nuttall.*
Melica diffusa var. *nitens* Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 44. 1885. Arkansas, *Nuttall.* [The type in the Academy of Natural Sciences, Philadelphia, is labeled *M. nitens* Nutt.]
Melica nitens Nutt.; Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 44. 1885, as synonym of *M. diffusa* var. *nitens.*

(11) **Melica porteri** Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 44. pl. 1. f. 17, 18. 1885. Based on *M. mutica* var. *parviflora* Porter.
Melica mutica var. *parviflora* Porter, in Port. and Coult., Syn. Fl. Colo. 149. 1874. Glen Eyrie, Colo., *Porter* [type], *Meehan*; Sierra Madre Range, *Coulter.*
Melica parviflora Scribn., Mem. Torrey Bot. Club 5: 50. 1894. Based on *M. mutica* var. *parviflora* Porter.

(1) **Melica smithii** (Porter) Vasey, Bull. Torrey Bot. Club 15: 294. 1888. Based on *Avena smithii* Porter.
Avena smithii Porter; A. Gray, Man. ed. 5. 640. 1867. Sault Sainte Marie, Mich., *C. E. Smith.*
Melica retrofracta Suksdorf, Deut. Bot. Monatsschr. 19: 92. 1901. Skamania County, Wash., [*Suksdorf* 2334].
Bromelica smithii Farwell, Rhodora 21: 77. 1919. Based on *Avena smithii* Porter.

(6) **Melica spectabilis** Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 45. pl. 1. f. 11, 12, 13. 1885. Montana, Crow Mountains, *Scribner* 385 [type]; Boseman Pass, *Canby* 368. Colorado, *Porter* in 1872. Yellowstone Park, *Parry* 295. Nevada (erroneously given as Utah), *Watson* 1303. Idaho, *Watson* 455. The synonyms cited by Scribner are erroneous, "*M. bulbosa* S. Wats., Bot. King Exp. 383" being an error for *M. poaeoides* Nutt., Bot. King Exp. 383; "Porter and Coulter Fl. Colorado 149." refers to the valid *M. bulbosa.*
Melica scabrata Scribn., in Piper, Fl. Palouse 25. 1901. Pullman, Wash., *Piper* 1745.

(10) **Melica stricta** Boland., Calif. Acad. Sci. Proc. 3: 4. 1863. Silver City, Nev., *Dunn.*

(4) **Melica subulata** (Griseb.) Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885. Based on *Bromus subulatus* Griseb.
Bromus subulatus Griseb., in Ledeb., Fl. Ross. 4: 358. 1853. Unalaska, *Eschscholtz.*
Melica acuminata Boland, Calif. Acad. Sci. Proc. 4: 104. 1870. Mendocino County, Calif., *Bolander* 4698.
Festuca acerosa Trin.; A. Gray, Amer. Acad. Sci. Proc. 8: 410. 1872, as synonym of *Bromus subulatus* Griseb.
Melica poaeoides var. *acuminata* Boland.; Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 47. 1885, as synonym of *M. subulata* Scribn. California, *Bolander* 4698.
Bromelica subulata Farwell, Rhodora 21: 78. 1919. The name is based on *Festuca subulata* Bong., doubtless an error for *Bromus subulatus* Griseb., since *Melica acuminata* Boland. is also cited.

This is the species to which Scribner (U.S.Dept.Agr., Div. Agrost. Circ. 30: 8. 1901) applied the name *Melica cepacea* Scribn., based on *Festuca cepacea* Phil., a Chilean species of *Melica*.

(14) **Melica torreyana** Scribn. Acad. Nat. Sci. Phila. Proc. 1885: 43. pl. 1. f. 3, 4. 1885. California, *Bigelow* in 1853–4.
Melica imperfecta var. *sesquiflora* Torr.; Scribn., Acad. Nat. Sci. Phila. Proc. 1885: 43. 1885, as synonym of *M. torreyana*, a herbarium name given a specimen collected by Bigelow in California in 1853–4.

(118) MELINIS Beauv.

(1) **Melinis minutiflora** Beauv., Ess. Agrost. 54. pl. 11. f. 4. 1812. Rio de Janeiro, Brazil.
Tristegis glutinosa Nees, Hor. Phys. Berol. 47, 54. pl. 7. 1820. Brazil.
Panicum minutiflorum Raspail, Ann. Sci. Nat., Bot. 5: 299. 1825. Based on *Melinis minutiflora* Beauv.
Panicum melinis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 291. 1834. Based on *Melinis minutiflora* Beauv.
Muhlenbergia brasiliensis Steud., Syn. Pl. Glum. 1: 177. 1854. Bahia, Brazil, *Salzmann* [652].
Agrostis polypogon Salzm.; Steud., Syn. Pl. Glum. 1: 177. 1854, as synonym of *Muhlenbergia brasiliensis*.

Mibora minima (L.) Desv., Obs. Angers 45. 1818. Based on *Agrostis minima* L.
Agrostis minima L., Sp. Pl. 63. 1753. France.

(81) MILIUM L.

(1) **Milium effusum** L., Sp. Pl. 61. 1753. Europe.
Miliarium effusum Moench, Meth. Pl. 204. 1794. Based on *Milium effusum* L.
Melica effusa Salisb., Prodr. Stirp. 20. 1796. Based on *Milium effusum* L.
Decandolia effusa Bast., Fl. Maine-et-Loire 28. 1808. Based on *Milium effusum* L.
Paspalum effusum Raspail, Ann. Sci. Nat. Bot. 5: 301. 1825. Based on *Milium effusum* L.

(141) MISCANTHUS Anderss.

Miscanthus nepalensis (Trin.) Hack., in DC., Monogr. Phan. 6: 104. 1889. Based on *Eulalia nepalensis* Trin.
Eulalia nepalensis Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 333. 1832. Nepal, India.

(1) **Miscanthus sinensis** Anderss., Öfv. Svensk, Vet. Akad. Förh. 12: 166. 1856. China.
Saccharum japonicum Thunb., Linn. Soc. Trans. 2: 328. 1794. Not *Miscanthus japonicus* Anderss., 1855. Japan.
Eulalia japonica Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 333. 1832. Based on *Saccharum japonicum* Thunb.
Miscanthus sinensis var. *variegatus* Beal, Grasses N.Amer. 2: 25. 1896. Cultivated.
Miscanthus sinensis var. *zebrinus* Beal, Grasses N.Amer. 2: 25. 1896. Cultivated.
Xiphagrostis japonica Coville, Contrib. U.S. Natl. Herb. 9: 400. 1905. Based on *Saccharum japonicum* Thunb.
Miscanthus sinensis var. *gracillimus* Hitchc., in Bailey, Cycl. Amer. Hort. 1021. f. 1408. 1901. Cultivated under the garden name *Eulalia japonica* var. *gracillima*.
Eulalia japonica var. *gracillima* Grier, Amer. Midl. Nat. 11: 331. 1929. Based on *Miscanthus sinensis* var. *gracillimus* Hitchc.

(14) MOLINIA Schrank

(1) **Molinia caerulea** (L.) Moench, Meth. Pl. 183. 1794. Based on *Aira caerulea* L.
Aira caerulea L., Sp. Pl. 63. 1753. Europe.
Festuca caerulea Lam. and DC., Fl. Franç. ed. 3. 3: 46. 1805. Based on *Aira caerulea* L.

Enodium coeruleum Gaudin, Agrost. Helv. 1: 145. 1811. Based on *Aira caerulea* L.

Cynodon caeruleus Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Molinia caerulea* Koel. (error for Moench).

Amblytes caerulea Dulac, Fl. Haut. Pyr. 80. 1867. Based on *Molinia caerulea* Moench.

(18) MONANTHOCHLOË Engelm.

(1) **Monanthochloë littoralis** Engelm., St. Louis Acad. Sci. Trans. 1: 437. pl. 13. 14. 1859. Texas, *Drummond*, *Berlandier* 3227 (Matamoros region), Galveston Island, *Lindheimer*; Florida, Key West, *Blodgett*.

(75) MUHLENBERGIA Schreb.

(32) **Muhlenbergia andina** (Nutt.) Hitchc., U.S. Dept. Agr. Bull. 772: 145. 1920. Based on *Calamagrostis andina* Nutt.

Calamagrostis andina Nutt., Jour. Acad. Nat. Sci. Phila. II. 1: 187. 1848. California, on the Colorado of the West, *Gambel*.

Vaseya comata Thurb., in A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 79. 1863. Nebraska [probably Wyoming, *Hall* and *Harbour* 685].

Muhlenbergia comata Thurb.; Benth., Jour. Linn. Soc. Bot. 19: 83. 1881. Based on *Vaseya comata* Thurb.

(12) **Muhlenbergia arenacea** (Buckl.) Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Based on *Sporobolus arenaceus* Buckl.

Sporobolus arenaceus Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1863. Western Texas, [*Wright* 737].

Sporobolus asperifolius var. *brevifolius* Vasey, Contrib. U.S. Natl. Herb. 1: 56. 1890, name only, Pena, Duval County, Tex., *Nealley*; Contrib. U.S. Natl. Herb. 3: 64. 1892, as synonym of *S. auriculatus* Vasey.

Sporobolus auriculatus Vasey, Contrib. U.S. Natl. Herb. 3: 64. 1892. Pena, Tex., *Nealley*.

(43) **Muhlenbergia arenicola** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1863. Western Texas, [*Wright* 735].

Podosaemum arenicola Bush, Amer. Midl. Nat. 7: 40. 1921. Based on *Muhlenbergia arenicola* Buckl.

(18) **Muhlenbergia arizonica** Scribn., Bull. Torrey Bot. Club 15: 8. pl. 76. f. A. 1888. Near Mexican Boundary, Arizona, *Pringle* in 1884.

(37) **Muhlenbergia arsenei** Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Sulphur Springs, N.Mex., *Arsène* and *Benedict* 16405.

(13) **Muhlenbergia asperifolia** (Nees and Mey.) Parodi, Univ. Nac. Buenos Aires Rev. Agron. 6: 117. f. 1. 1928. Based on *Sporobolus asperifolius* Nees and Mey.

Vilfa asperifolia Meyen, Reis. Erd. 1: 408. 1834, name only; Nees and Mey., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 95. 1840. Chile, *Meyen*.

Sporobolus asperifolius Nees, Nov. Act. Acad. Caes. Leop. Carol. 19: Sup. 1: 9. 1841; 141. 1843. Based on *Vilfa asperifolia* Nees and Mey.

Agrostis distichophylla R. A. Phil., Fl. Atac. 54. 1860. Not *A. distichophylla* Roem. and Schult., 1817. Chile. (Fide Parodi.)

Sporobolus sarmentosus Griseb., Abhandl. Gesell. Wiss. Göttingen 24: 295. 1879. Argentina.

Sporobolus deserticolus Phil., An. Mus. Nac. Chile Bot. 8: 82. 1891. Chile. (Fide Parodi.)

Sporobolus asperifolius var. *major* Vasey, Contrib. U.S. Natl. Herb. 3: 64. 1892. [Marfa, Tex., *Havard* 10 in 1883.]

Sporobolus distichophyllus Phil., An. Univ. Chile 94: 7. 1896. Based on *Agrostis distichophylla* Phil.

Agrostis eremophila Speg., An. Mus. Nac. Buenos Aires 7: 190. 1902. Based on *A. distichophylla* Phil.

(24) **Muhlenbergia brachyphylla** Bush, Amer. Midl. Nat. 6: 41. 1919. Webb City, Mo., *Palmer* 2734. (Not invalidated by *M. brachyphylla* Nees; Jacks., Ind. Kew. 3: 269. 1894, a clerical error for *Podosaemum brachyphyllum* Nees.)

(21) **Muhlenbergia californica** Vasey, Bull. Torrey Bot. Club 13: 53. 1886. Based on *M. glomerata* var. *brevifolia* Vasey.

Muhlenbergia glomerata var. *brevifolia* Vasey, Bot. Gaz. 7: 92. 1882. [San Bernardino Mountains], Calif., *Parish* [1028].

Muhlenbergia sylvatica var. *californica* Vasey, Bot. Gaz. 7: 93. 1882. San Bernardino Mountains, Calif., *Parish* [1076].

Muhlenbergia parishii Vasey, Bull. Torrey Bot. Club 13: 53. 1886. Based on *M. sylvatica* var. *californica* Vasey.

Muhlenbergia racemosa var. *brevifolia* Beal, Grasses N.Amer. 2: 253. 1896. Based on *M. glomerata* var. *brevifolia* Vasey.

(48) **Muhlenbergia capillaris** (Lam.) Trin., Gram. Unifl. 191. 1824. Based on *Trichochloa capillaris* DC.

Stipa diffusa Walt., Fl. Carol. 78. 1788. Not *Muhlenbergia diffusa* Willd., 1798. South Carolina.

Stipa capillaris Lam., Tabl. Encycl. 1: 158. 1791. Carolina, *Fraser*.

Podosaemum capillare Desv., Nouv. Bull. Soc. Philom. (Paris) 2: 188. 1810. Based on *Stipa capillaris* Lam.

Tosagris agrostidea Beauv., Ess. Agrost. 29. pl 8. f. 3. 1812. United States.

Podosaemum agrostideum Beauv., Ess. Agrost. 176, 179. 1812. Based on *Tosagris agrostidea* Beauv.

Trichochloa capillaris DC., Cat. Hort. Monsp. 152. 1813. Based on *Stipa capillaris* Lam.

Trichochloa polypogon DC., Cat. Hort. Monsp. 152. 1813. Carolina, *Fraser*.

Muhlenbergia polypogon Kunth, Rév. Gram. 1: 64. 1829. Based on *Trichochloa polypogon* DC.

Agrostis setosa Willd.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 300. 1841, as synonym of *Muhlenbergia capillaris*. "Willd. hb. 1682," received from Muhlenberg.

Muhlenbergia trichodes Steud., Syn. Pl. Glum. 1: 177. 1854. Said to be from South America, but Steudel's type is from Guadeloupe, West Indies.

MUHLENBERGIA CAPILLARIS var. FILIPES (M. A. Curtis) Chapm.; Beal, Grasses N.Amer. 2: 256. 1896. Based on *M. filipes* M. A. Curtis.

Stipa sericea Michx., Fl. Bor. Amer. 1: 54. 1803. South Carolina, *Michaux*.

Agrostis sericea Ell., Bot. S.C. and Ga. 1: 135. 1816. Based on *Stipa sericea* Michx.

Polypogon sericea Spreng., Syst. Veg. 1: 243. 1825. Based on *Stipa sericea* Michx.

Muhlenbergia filipes M. A. Curtis, Amer. Jour. Sci. 44: 83. 1843. Sea Islands of North Carolina; Florida, [*M. A. Curtis*].

Podosaemum filipes Bush, Amer. Midl. Nat. 7: 29. 1921. Based on *Muhlenbergia filipes* M. A. Curtis.

(9) **Muhlenbergia curtifolia** Scribn., Bull. Torrey Bot. Club 38: 328. 1911. Between Kanab and Carmel, Utah, *Jones* 6047.

(31) **Muhlenbergia curtisetosa** (Scribn.) Bush, Amer. Midl. Nat. 6: 35. 1919. Based on *M. schreberi curtisetosa* Scribn.

Muhlenbergia schreberi curtisetosa Scribn., Rhodora 9: 17. 1907. Illinois, *Wolf* in 1881.

(10) **Muhlenbergia cuspidata** (Torr.) Rydb., Bull. Torrey Bot. Club 32: 599. 1905. Based on *Vilfa cuspidata* Torr.

Agrostis brevifolia Nutt., Gen. Pl. 1: 44. 1818. Fort Mandan, [N.Dak.].

Vilfa cuspidata Torr.; Hook., Fl. Bor. Amer. 2: 238. 1840. Saskatchewan River, Rocky Mountains, *Drummond*.

Vilfa gracilis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 104. 1840. Not *V. gracilis* Trin., op. cit. 74. North America, received from Hooker.

Sporobolus cuspidatus Wood, Amer. Bot. and Flor. pt. 2: 385. 1874. Based on *Vilfa cuspidata* Torr.

Sporobolus brevifolius Scribn., Mem. Torrey Bot. Club 5: 39. 1894. Not *S. brevifolius* Nees, 1841. Based on *Agrostis brevifolia* Nutt. As new, Nash, in Britton, Man. 105. 1901, same basis.

Muhlenbergia brevifolia Jones, Contrib. West. Bot. 14: 12. 1912. Not *M. brevifolia* Scribn., 1896. Based on *Agrostis brevifolia* Nutt.

(3) **Muhlenbergia depauperata** Scribn., Bot. Gaz. 9: 187. 1884. Arizona, *Pringle*.

Muhlenbergia schaffneri Fourn., Mex. Pl. 2: 85. 1886. Mexico, Tacubaya, *Schaffner* 50, 514; Mirador, *Schaffner* 142.

Lycurus schaffneri Mez, Repert. Sp. Nov. Fedde 17: 212. 1921. Based on *Muhlenbergia schaffneri* Fourn.

(45) **Muhlenbergia dubia** Fourn. in Hemsl., Biol. Centr. Amer. Bot. 3: 540. 1885. Chinantla, Mexico, *Liebmann* [688].

Muhlenbergia acuminata Vasey, Bot. Gaz. 11: 337. 1886. New Mexico, *Wright* 1993.

Sporobolus ligulatus Vasey and Dewey, Contrib. U.S. Natl. Herb. 1: 268. 1893. Presidio County, Tex., *Nealley*, 127.

Sporobolus inflatus Vasey and Dewey; Beal, Grasses N.Amer. 2: 289. 1896. Error for *S. ligulatus* Vasey and Dewey.

Crypsinna breviglumis Jones, Contrib. West. Bot. 14: 8. 1912. Chihuahua, Mexico [*Jones* in 1903].

(19) **Muhlenbergia dumosa** Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 71. 1892. Santa Catalina Mountains, Ariz., *Pringle* [in 1884], *Lemmon;* Mexico, *Pringle;* southern California, *Orcutt.*

Muhlenbergia dumosa var. *minor* Scribn.; Beal, Grasses N.Amer. 2: 261. 1896. Mexico, *Pringle* 2355.

(54) **Muhlenbergia emersleyi** Vasey, Contrib. U.S. Natl. Herb. 3: 66. 1892. Southern Arizona, *Emersley.*

Muhlenbergia vaseyana Scribn., Mo. Bot. Gard. Rept. 10: 52. 1899. Based on *M. distichophylla* as described by Vasey (Wheeler, Rept. U.S. Survey 100th Merid. 6: 283. 1878, Arizona, *Rothrock* 282, type).

Epicampes emerslcyi Hitchc., U.S. Dept. Agr. Bull. 772: 144. 1920. Based on *Muhlenbergia emersleyi* Vasey.

Epicampes subpatens Hitchc., U.S. Dept. Agr. Bull. 772: 144. 1920. Guadalupe Mountains, N.Mex., *Hitchcock* 13541.

(49) **Muhlenbergia expansa** (Poir.) Trin.; Kunth, Enum. Pl. 1: 207. 1833. Based on *Trichochloa expansa* DC., this based on *Stipa expansa* Poir.

Stipa expansa Poir., in Lam., Encycl. 7: 453. 1806. Carolina, *Bosc.*

Agrostis arachnoidea Poir., in Lam., Encycl. Sup. 1: 249. 1810. Carolina, *Bosc.*

Trichochloa purpurea Beauv., Ess. Agrost. 29. pl. 8. f. 2. 1812. United States.

Vilfa arachnoidea Beauv., Ess. Agrost. 147, 181. 1812. Presumably based on *Agrostis arachnoidea* Poir.

Podosaemum purpureum Beauv., Ess. Agrost. 176, 179. pl. 8. f. 2. 1812. Based on *Trichochloa purpurea* Beauv.

Trichochloa expansa DC., Cat. Hort. Monsp. 151. 1813. Based on *Stipa expansa* Poir.

Agrostis rubicunda Bosc; DC., Cat. Hort. Monsp. 151. 1813, as synonym of *Trichochloa expansa* DC.

Agrostis trichopodes Ell., Bot. S.C. and Ga. 1: 135. pl. 8. f. 1. 1816. Chatham County, Ga., *Baldwin.*

Cinna arachnoidea Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis arachnoidea* Poir.

Muhlenbergia arachnoidea Trin.; Kunth, Enum. Pl. 1: 207. 1833. Based on *Agrostis arachnoidea* Poir.

Agrostis expansa Poir.; Steud., Nom. Bot. ed. 2. 1: 40. 1840, as synonym of *Cinna arachnoidea* Kunth.

Agrostis longiflora Willd.; Steud., Nom. Bot. ed. 2. 1: 41. 1840, as synonym of *Cinna arachnoidea* Kunth.

Muhlenbergia trichopodes Chapm., Fl. South. U.S. 553. 1860. Based on *Agrostis trichopodes* Ell.

Muhlenbergia caespitosa Chapm., Bot. Gaz. 3: 18. 1878. Apalachicola, Fla., *Chapman.*

Muhlenbergia capillaris var. *trichopodes* Vasey, Contrib. U.S. Natl. Herb. 3: 66. 1892. Based on *Agrostis trichopodes* Ell.

Podosaemum trichopodes Bush, Amer. Midl. Nat. 7: 30. 1921. Based on *Agrostis trichopodes* Ell.

(17) **Muhlenbergia filiculmis** Vasey, Contrib. U.S. Natl. Herb. 1: 267. 1893. Green Mountain Falls, Colo., *Sheldon* [321].

(4) **Muhlenbergia filiformis** (Thurb.) Rydb., Bull. Torrey Bot. Club 32: 600. 1905. Based on *Vilfa depauperata* var. *filiformis* Thurb.

Vilfa depauperata var. *filiformis* Thurb.; S. Wats., in King, Geol. Expl. 40th Par. 5: 376. 1871. Yosemite Valley, Calif., *Bolander* 6091; Donner Lake, *Torrey* 565; East Humboldt Mountains, Nev., *Watson* 1280; Uinta Mountains, Utah, *Watson* 1281.

Vilfa gracillima Thurb., in S. Wats., Bot. Calif. 2: 268. 1880. Not *Muhlenbergia gracillima* Torr. 1856. California, Sierra Nevada, *Brewer* [2827]; Yosemite Valley, *Bolander* [6091].

Sporobolus gracillimus Vasey, Descr. Cat. Grasses U.S. 44. 1885. Based on *Vilfa gracillima* Thurb.

Sporobolus filiformis Rydb., Contrib. U.S. Natl. Herb. 3: 189. 1895. Based on *Vilfa depauperata* var. *filiformis* Thurb.

Sporobolus depauperatus var. *filiformis* Beal, Grasses N.Amer. 2: 296. 1896. Montana, *Williams;* Utah, *Jones.*

Sporobolus simplex Scribn., U.S. Dept. Agr., Div. Agrost. Bull. 11: 48. 1898. Georgetown, Colo., *Rydberg* 2411.
Sporobolus aristatus Rydb., Bull. Torrey Bot. Club 28: 266. 1901. Big Horn Mountains, Wyo., *Tweedy* 2196.
Sporobolus simplex thermale Merr., Rhodora 4: 48. 1902. Lolo Hot Springs, Mont., *Griffiths* 302a.
Muhlenbergia simplex Rydb., Bull. Torrey Bot. Club 32: 600. 1905. Not *M. simplex* Kunth, 1829. Based on *Sporobolus simplex* Scribn.
Muhlenbergia aristulata Rydb., Bull. Torrey Bot. Club 32: 600. 1905. Based on *Sporobolus aristatus* Rydb.

(29) **Muhlenbergia foliosa** (Roem. and Schult.) Trin., Gram. Unifl. 190. 1824. Based on *Agrostis foliosa* "Hortul." Roem. and Schult.
Agrostis filiformis Willd., Enum. Pl. 1: 95. 1809. Not *A. filiformis* Vill. 1787. [Pennsylvania], North America.
Agrostis foliosa "Hortul."; Roem. and Schult., Syst. Veg. 2: 373. 1817. Garden specimen; seed from North America.
Trichochloa foliosa Trin., Fund. Agrost. 117. 1820. Based on *Agrostis filiformis* Willd.
Cinna filiformis Link, Enum. Pl. 1: 70. 1821. Based on *Agrostis filiformis* Willd.
Agrostis lateriflora var. *filiformis* Torr. Fl. North. and Mid. U.S. 1: 86. 1823. Based on *A. filiformis* Muhl. (error for Willd.).
Trichochloa filiformis Trin.; Torr., Fl. North. and Mid. U.S. 86. 1823, as synonym of *Agrostis lateriflora* var. *filiformis* Torr.
Podosaemum foliosum Link, Hort. Berol. 1: 83. 1827. Based on *Agrostis foliosa* Roem. and Schult.
Muhlenbergia mexicana var. *purpurea* Wood, Amer. Bot. and Flor. pt. 2: 386. 1870. Illinois, *Wolf.*
Muhlenbergia sylvatica var. *vulpina* Wood, Amer. Bot. and Flor. pt. 2: 386. 1870. New York, *Lord.*
Calamagrostis compressa Doell, in Mart., Fl. Bras. 2^3: 56. 1878. "E seminibus a cl. Glaziou prope Rio de Janeiro lectis in horto bot. Monacensi anno 1869 cultura enata." A specimen named in Doell's script and bearing the above data is in Doell's herbarium in the Botanical Institute at Freiburg. This agrees perfectly with Doell's description. It is a characteristic specimen of *Muhlenbergia foliosa* except that the rachilla is minutely produced beyond the palea, a very rare occurrence in *Muhlenbergia.* Presumably the seed from Rio de Janeiro failed to germinate, and this species, probably in a neighboring plot, intruded.
Muhlenbergia mexicana var. *filiformis* Vasey, Grasses U.S. 23. 1883. Name only.
Muhlenbergia mexicana filiformis Scribn., Mem. Torrey Bot. Club 5: 36. 1894. Based on *A. filiformis* Muhl. (error for Willd.).
Muhlenbergia polystachya Mackenz. and Bush, Man. Fl. Jackson County 23. 1902. Sibley, Mo., *Mackenzie* 637.
Muhlenbergia ambigua var. *filiformis* Farwell, Mich. Acad. Sci. Rept. 20: 168. 1919. Based on *Agrostis filiformis* Muhl. (error for Willd.).

MUHLENBERGIA FOLIOSA var. SETIGLUMIS (S. Wats.) Scribn., Rhodora 9: 20. 1907. Based on *M. sylvatica* var. *setiglumis* S. Wats. (Published as *M. foliosa setiglumis.*)
Muhlenbergia ambigua Torr., in Nicoll., Rept. Miss. 164. 1843. "Okaman Lake, Sioux Country," *Geyer.*
Muhlenbergia sylvatica var. *setiglumis* S. Wats., in King, Geol. Expl. 40th Par. 5: 378. 1871. Humboldt Pass, Nev., *Watson* 1288.
Muhlenbergia foliosa ambigua Scribn., Rhodora 9: 20. 1907. Based on *M. ambigua* Torr.
Muhlenbergia setiglumis Nels. and Macbr., Bot. Gaz. 61: 30. 1916. Based on *M. sylvatica* var. *setiglumis* S. Wats.
Muhlenbergia foliosa forma *ambigua* Wiegand, Rhodora 26: 1. 1924. Based on *M. ambigua* Torr.

(27) **Muhlenbergia glabriflora** Scribn., Rhodora 9: 22. 1907. Texas, *Reverchon* 5.

(20) **Muhlenbergia glauca** (Nees) Mez, Repert. Sp. Nov. Fedde 17: 214. 1921. Based on *Podosaemum glaucum* Nees. In Index Kewensis this name is credited to Nees in Linnaea 19: 689. 1847, but the name there is *Podosaemum glaucum.*
Podosaemum glaucum Nees, Linnaea 19: 689. 1847. Mexico, *Aschenborn* 335.

Agrostis glauca Steud., Syn. Pl. Glum. 1: 175. 1854. Not *A. glauca* Muhl. 1817. Based on *Podosaemum glaucum* Nees.

Muhlenbergia lemmoni Scribn., Contrib. U.S. Natl. Herb. 1: 56. 1890. Ballinger, Tex., *Nealley;* New Mexico; Arizona [*Lemmon* 2918, type, the species being named for *Lemmon*]; Mexico.

Muhlenbergia huachucana Vasey, Contrib. U.S. Natl. Herb. 3: 69. 1892. Huachuca Mountains, Ariz., *Lemmon* [2915].

(53) **Muhlenbergia involuta** Swallen, Amer. Jour. Bot. 19: 436. f. 2. 1932. San Antonio, Tex., *Silveus* 358.

(33) **Muhlenbergia jonesii** (Vasey) Hitchc., in Jepson, Fl. Calif. 1: 111. 1912. Based on *Sporobolus jonesii* Vasey.

Sporobolus jonesii Vasey, Bot. Gaz. 6: 297. 1881. Soda Springs, Calif., *Jones* [303] in 1881.

(52) **Muhlenbergia lindheimeri** Hitchc., Jour. Wash. Acad. Sci. 24: 291. 1934. Texas, *Lindheimer* 725. (This species has been referred to *Epicampes berlandieri* Fourn., and to *Muhlenbergia fournieriana* Hitchc., based upon it, but that species is confined to Mexico.)

Epicampes gracilis Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 271. 1841. Not *Muhlenbergia gracilis* Kunth, 1829. Mexico [Eastern Texas, probably *Berlandier*].

(51) **Muhlenbergia longiligula** Hitchc., Amer. Jour. Bot. 21: 136. 1934. Based on *Epicampes ligulata* Scribn.

Epicampes ligulata Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 58. 1892. Not *Muhlenbergia ligulata* Scribn. and Merr. Texas to Arizona [type, Santa Rita Mountains, *Pringle* in 1884] and Mexico.

Epicampes distichophylla var. *mutica* Scribn.; Beal, Grasses N.Amer. 2: 308. 1896. Arizona, *Toumey* 740 [type]; Mexico, *Pringle* 1427. The other specimens cited do not agree with the description.

Epicampes anomala Scribn., in Beal, Grasses N.Amer. 2: 311. 1896. Not *Muhlenbergia anomalis* Fourn., 1886. Chihuahua, Mexico, *Pringle* 1423.

Melica anomala Scribn., in Beal, Grasses N.Amer. 2: 311. 1896, as synonym of *Epicampes anomala.*

Epicampes stricta var. *mutica* Jones, Contrib. West. Bot. 14: 6. 1912. Based on *E. distichophylla* var. *mutica* Scribn.

(47) **Muhlenbergia metcalfei** Jones, Contrib. West. Bot. 14: 12. 1912. Santa Rita Mountains, N.Mex., *Metcalfe* 1485. The name was published as "*Metcalfi.*"

(26) **Muhlenbergia mexicana** (L.) Trin., Gram. Unifl. 189. 1824. Based on *Agrostis mexicana* L.

Agrostis mexicana L., Mant. Pl. 1: 31. 1767. Grown at Upsala, erroneously credited to tropical America.

Agrostis lateriflora Michx., Fl. Bor. Amer. 1: 53. 1803. Mississippi River [Illinois], *Michaux.*

Vilfa mexicana Beauv., Ess. Agrost. 16, 148, 181. 1812. Based on *Agrostis mexicana* L.

Vilfa lateriflora Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis lateriflora* Michx. (Appears erroneously as *laterifolia* on pages 16 and 147, but correctly on page 181.)

Cinna? mexicana Beauv., Ess. Agrost. 32, 148, 158. 1812. Based on *Agrostis mexicana* L.

Trichochloa mexicana Trin., Fund. Agrost. 117. 1820. Based on *Agrostis mexicana* L.

Podosaemum mexicanum Link, Hort. Berol. 1: 84. 1827. Based on *Muhlenbergia mexicana* "Linn."

Cinna lateriflora Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis lateriflora* Michx.

Muhlenbergia lateriflora Trin.; Kunth, Enum. Pl. 1: 207. 1833. Based on *Agrostis lateriflora* Michx.

Cinna arundinacea Retz.; Steud., Nom. Bot. ed. 2. 1: 365. 1840. Not *C. arundinacea* L., 1753, as synonym of *C. mexicana* Beauv.

Polypogon canadensis Fourn., Mex. Pl. 2: 92. 1886. Based on *Agrostis mexicana* L.

Lepyroxis canadensis Beauv.; Jacks., Ind. Kew. Suppl. 1: 244. 1906, as synonym of *Agrostis mexicana* L.

MUHLENBERGIA MEXICANA var. COMMUTATA Scribn., Rhodora 9: 18. 1907. (Of the five specimens cited the first two are *M. foliosa* var. *setiglumis*, the other three are the form described. Of these *Fernald* 522 in 1896, from Maine, is taken as type.) (Published as *M. mexicana commutata.*)

Muhlenbergia mexicana var. *commutata* Farwell, Rep. Mich. Acad. Sci. 17: 181. 1916. Based on *M. mexicana commutata* Scribn.

Muhlenbergia commutata Bush, Amer. Midl. Nat. 6: 61. 1919. Based on *M. mexicana commutata* Scribn.

Muhlenbergia mexicana forma *commutata* Farwell, Rhodora 26: 1. 1924. Based on *M. mexicana commutata* Scribn.

(2) **Muhlenbergia microsperma** (DC.) Kunth, Rév. Gram. 1: 64. 1829. Based on *Trichochloa microsperma* DC.

Trichochloa microsperma DC., Cat. Hort. Monsp. 151. 1813. Mexico.

Podosaemum setosum H.B.K., Nov. Gen. and Sp. 1: 129. 1815. Mexico, *Humboldt* and *Bonpland*.

Podosaemum debile H.B.K., Nov. Gen. and Sp. 1: 128. 1815. Ecuador, *Humboldt* and *Bonpland*.

Agrostis microsperma Lag., Gen. and Sp. Nov. 2. 1816. Mexico, *Sessé*.

Trichochloa debilis Roem. and Schult., Syst. Veg. 2: 385. 1817. Based on *Podosaemum debile* H.B.K.

Trichochloa setosa Roem. and Schult., Syst. Veg. 2: 386. 1817. Based on *Podosaemum setosum* H.B.K.

Muhlenbergia fasciculata Trin., Gram. Unifl. 192. 1824. North America.

Agrostis setosa Spreng., Syst. Veg. 1: 262. 1825. Based on *Podosaemum setosum* H.B.K.

Agrostis debilis Spreng., Syst. Veg. 1: 262. 1825. Not *A. debilis* Poir., 1810. Based on *Podosaemum debile* H.B.K.

Muhlenbergia setosa Kunth, Rév. Gram. 1: 63. 1829. Based on *Podosaemum setosum* H.B.K.

Muhlenbergia debilis Kunth, Rév. Gram. 1: 63. 1829. Based on *Podosaemum debile* H.B.K.

Agrostis microcarpa Steud., Nom. Bot. ed. 2. 1: 41. 1840; 2: 164. 1841, as synonym of *Muhlenbergia microsperma*.

Muhlenbergia purpurea Nutt., Jour. Acad. Nat. Sci. Phila. II. 1: 186. 1848. Santa Barbara and Santa Catalina Island, Calif., *Gambel*.

Muhlenbergia ramosissima Vasey, Bull. Torrey Bot. Club 13: 231. 1886. Chihuahua, Mexico, *Palmer* [158] in 1885.

(34) **Muhlenbergia montana** (Nutt.) Hitchc., U.S. Dept.Agr. Bull. 772: 145, 147. 1920. Based on *Calycodon montanum* Nutt.

Calycodon montanum Nutt., Jour. Acad. Nat. Sci. Phila. II. 1: 186. 1848. Santa Fe, [New] Mexico, *Gambel*.

Muhlenbergia gracilis var. *breviaristata* Vasey, in Torr., Cat. Pl. Survey W. 100th Merid. 54. 1874. Twin Lakes, Colo., [*Wolf*] 1090 in 1873.

Muhlenbergia gracilis var. *major* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 284. 1878. Mount Graham, Ariz., Wheeler Exped. [*Rothrock*] 744.

Muhlenbergia subalpina Vasey, Deser. Cat. Grasses U.S. 40. 1885. Based on *M. gracilis* var. *breviaristata* Vasey.

Muhlenbergia trifida Hack., Repert. Sp. Nov. Fedde 8: 518. 1910. Michoacán, Mexico, *Arsène* 3217.

This is the species referred to *Muhlenbergia gracilis* by American authors, not *M. gracilis* (H.B.K.) Kunth.

(38) **Muhlenbergia monticola** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1863. "Northwestern Texas," [*Wright* 731].

Muhlenbergia sylvatica var. *flexuosa* Vasey in Wheeler, Rep. U.S. Survey 100th Merid. 6: 284. 1878. New Mexico, *Wright* 731; Camp Crittenden, Ariz., *Rothrock* 681.

(39) **Muhlenbergia parviglumis** Vasey, Contrib. U.S. Natl. Herb. 3: 71. 1892. Texas, *Nealley*.

(40) **Muhlenbergia pauciflora** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1863. Western Texas, [*Wright* 732].

Muhlenbergia sylvatica var. *pringlei* Scribn., Bull. Torrey Bot. Club 9: 89. 1882. Santa Rita Mountains, N.Mex., *Pringle* 480.

Muhlenbergia neo-mexicana Vasey, Bot. Gaz. 11: 337. 1886. New Mexico [type, *G. R. Vasey*] and Arizona.

Muhlenbergia pringlei Scribn., in Vasey, Contrib. U.S. Natl. Herb. 3: 71. 1892. Santa Rita Mountains, N.Mex., *Pringle* 480.

(36) **Muhlenbergia polycaulis** Scribn., Bull. Torrey Bot. Club. 38: 327. 1911. Chihuahua, Mexico, *Pringle* 1414.

(41) **Muhlenbergia porteri** Scribn.; Beal, Grasses N.Amer. 2: 259. 1896. Based on *M. texana* Thurb.

Muhlenbergia texana Thurb.; Port. and Coult., Syn. Fl. Colo. 144. 1874. Not *M. texana* Buckl., 1863. Texas, *Bigelow; Parry; Wright* 734.

Podosaemum porteri Bush, Amer. Midl. Nat. 7: 36. 1921. Based on *Muhlenbergia porteri* Scribn.

(16) **Muhlenbergia pungens** Thurb., in A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 78. 1863. Rocky Mountains, Colo., *Hall* and *Harbour* 632.

Podosaemum pungens Bush, Amer. Midl. Nat. 7: 32. 1921. Not *P. pungens* Link, 1827. Based on *Muhlenbergia pungens* Thurb.

(25) **Muhlenbergia racemosa** (Michx.) B.S.P., Prel. Cat. N.Y. 67. 1888. Presumably based on *Agrostis racemosa* Michx.

Agrostis racemosa Michx., Fl. Bor. Amer. 1: 53. 1803. Mississippi River [Ill.], *Michaux.*

Polypogon setosus Spreng., Mant. Fl. Hal. 31. 1807. Pennsylvania, *Muhlenberg.*

Polypogon glomeratus Willd., Enum. Pl. 87. 1809. North America.

Vilfa racemosa Beauv., Ess. Agrost. 16, 148, 182. 1812. Based on *Agrostis racemosa* Michx.

Alopecurus glomeratus Poir., in Lam., Encycl. 5: 495. 1817. Based on *Polypogon glomeratus* Willd.

Agrostis setosa Muhl., Descr. Gram. 68. 1817. Pennsylvania.

Agrostis festucoides Muhl.; Roem. and Schult., Syst. Veg. 1: 326. 1817, as synonym of *Polypogon glomeratus* Willd.

Polypogon racemosus Nutt., Gen. Pl. 1: 51. 1818. Based on *Agrostis racemosa* Michx.

Trichochloa glomerata Trin., Fund. Agrost. 117. 1820. Based on *Polypogon glomeratus* Willd.

Trichochloa calycina Trin., Fund. Agrost. 117. 1820. "*Agrostis setosa* Spreng." (ined.) cited, no description.

Agrostis setosa Spreng.; Trin., Fund. Agrost. 117. 1820. As synonym of *Trichochloa calycina* Trin., not *A. setosa* Spreng. himself, 1824, (see synonymy under *Muhlenbergia microsperma*).

Muhlenbergia glomerata Trin., Gram. Unifl. 191. pl. 5. f. 10. 1824. Based on *Polypogon glomeratus* Willd.

Muhlenbergia calycina Trin., Gram. Unifl. 193. 1824. Based on *Trichochloa calycina* Trin., and cited as synonym of *Polypogon setosus* Spreng.

Podosaemum glomeratum Link, Hort. Berol. 1: 84. 1827. Based on *Polypogon glomeratus* Willd.

Cinna racemosa Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis racemosa* Michx.

Dactylogramma cinnoides Link, Hort. Berol. 2: 248. 1833. Grown in Berlin, seed from Richardson, western North America.

Cinna glomerata Link, Hort. Berol. 2: 237. 1833. Not *C. glomerata* Walt., 1788. Based on *Podosaemum glomeratum* Link.

Muhlenbergia glomerata var. *ramosa* Vasey, Descr. Cat. Grasses U.S. 40. 1885. Illinois to Colorado and Montana. [Type, collected by Vasey, marked "Dakota and Wisconsin."]

Muhlenbergia racemosa var. *ramosa* Vasey; Beal, Grasses N.Amer. 2: 253. 1896. Presumably based on *M. glomerata* var. *ramosa* Vasey.

Muhlenbergia racemosa violacea Scribn., Rhodora 9: 22. 1907. North Hannibal, N.Y., *Pearce* in 1883.

(5) **Muhlenbergia repens** (Presl) Hitchc., in Jepson, Fl. Calif. 1: 111. 1912. Based on *Sporobolus repens* Presl.

Sporobolus repens Presl, Rel. Haenk. 1: 241. 1830. Mexico, *Haenke.*

Vilfa repens Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 102. 1840. Based on *Sporobolus repens* Presl.

Muhlenbergia subtilis Nees, Linnaea 19: 689. 1847. Mexico, *Aschenborn* 206.

(50) **Muhlenbergia reverchoni** Vasey and Scribn., Contrib. U.S. Natl. Herb. 3: 66. 1892. Texas, *Reverchon* [73].

Podosaemum reverchoni Bush, Amer. Midl. Nat. 7: 38. 1921. Based on *Muhlenbergia reverchoni* Vasey and Scribn.

(55) **Muhlenbergia rigens** (Benth.) Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. Based on *Epicampes rigens* Benth.

Cinna macroura (Kunth misapplied by) Thurb.; S. Wats., Bot. Calif. 2: 276. 1880. Not *C. macroura* (H.B.K.) Kunth, 1835. California.

Vilfa rigens Thurb.; S. Wats., Bot. Calif. 2: 276. 1880. Not *V. rigens* Trin., 1830. As synonym of *C. macroura* Kunth. "Sonora" [probably error for Sonoma] California, *Bolander* [6124].

Epicampes rigens Benth., Jour. Linn. Soc. Bot. 19: 88. 1881. Based on the species Thurber described as *Cinna macroura*, not that of (H.B.K.) Kunth.

Crypsinna rigens Jones, Contrib. West. Bot. 14: 8. 1912. Based on *Epicampes rigens* Benth.

(46) **Muhlenbergia rigida** (H.B.K.) Kunth, Rév. Gram. 1: 63. 1829. Based on *Podosaemum rigidum* H.B.K.

Podosaemum rigidum H.B.K., Nov. Gen. and Sp. 1: 129. 1815. Mexico, *Humboldt* and *Bonpland.*

Trichochloa rigida Roem. and Schult., Syst. Veg. 2: 386. 1817. Based on *Podosaemum rigidum* H.B.K.

Muhlenbergia berlandieri Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 299. 1841. Mexico, *Berlandier.*

(30) **Muhlenbergia schreberi** Gmel., Syst. Nat. 2: 171. 1791. Based on the species described by Schreber (Gen. Pl. 1: 44. 1789) under *Muhlenbergia* with no specific name, [Pennsylvania].

Muhlenbergia diffusa Willd., Sp. Pl. 1: 320. 1797. North America.

Dilepyrum minutiflorum Michx., Fl. Bor. Amer. 1: 40. 1803. Kentucky and Illinois, *Michaux.* Listed as *Dylepyrum multiflorum* by Beauv., Ess. Agrost. 160. 1812.

Dylepyrum diffusum Beauv., Ess. Agrost. 160. 1812. Name only, referred to *Muhlenbergia.* Probably the same as *M. diffusa* Willd.

Cynodon diffusus Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on "*Muhlenbergia* Schr." (error for Willd.).

Agrostis apetala Bosc; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 287. 1841, as synonym of *Muhlenbergia diffusa* Schreb.

Muhlenbergia botteri Fourn., Mex. Pl. 2: 85. 1886. Orizaba, Mexico, *Botteri* 87.

Muhlenbergia minutiflorum Hitchc., Kans. Acad. Sci. Trans. 14: 140. 1896. Based on *Dilepyrum minutiflorum* Michx.

MUHLENBERGIA SCHREBERI var. PALUSTRIS (Scribn.) Scribn., Rhodora 9: 17. 1907. Based on *M. palustris* Scribn. (Published as *M. schreberi palustris.*)

Muhlenbergia palustris Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 47. 1898. District of Columbia, *Steele* in 1896.

Muhlenbergia schreberi var. *palustris* Scribn.; Robinson, Rhodora 10: 65. 1908. Based on *M. palustris* Scribn.

(44) **Muhlenbergia setifolia** Vasey, Bot. Gaz. 7: 92. 1882. Guadalupe Mountains, Tex., *Havard.*

(22) **Muhlenbergia sobolifera** (Muhl.) Trin., Gram. Unifl. 189. pl. 5. f. 4. 1824. Based on *Agrostis sobolifera* Muhl.

Agrostis sobolifera Muhl.; Willd., Enum. Pl. 95. 1809. Pennsylvania.

Achnatherum soboliferum Beauv., Ess. Agrost. 20, 146. 1812. Based on *Agrostis sobolifera* Muhl.

Trichochloa sobolifera Trin., Fund. Agrost. 117. 1820. Based on *Agrostis sobolifera* Muhl.

Cinna sobolifera Link, Enum. Pl. 1: 71. 1821. Based on *Agrostis sobolifera* Willd.

Podosaemum soboliferum Link, Hort. Berol. 1: 83. 1827. Based on *Agrostis sobolifera* Muhl.

MUHLENBERGIA SOBOLIFERA var. SETIGERA Scribn., Rhodora 9: 18. 1907. Texas, *Reverchon* 70. (Published as *M. sobolifera setigera.*)

Muhlenbergia sobolifera forma *setigera* Deam, Ind. Dept. Conserv. Pub. 82: 163. 1929. Based on *M. sobolifera setigera* Scribn.

(7) **Muhlenbergia squarrosa** (Trin.) Rydb., Bull. Torrey Bot. Club 36: 531. 1909. Based on *Vilfa squarrosa* Trin.

Vilfa squarrosa Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 100. 1840. Menzies Island [Columbia River, Wash.].

Vilfa richardsonis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 103. 1840. North America, *Richardson.*

Muhlenbergia aspericaulis Nees; Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 103. 1840, as synonym of *Vilfa richardsonis* Trin.

Vilfa depauperata Torr.; Hook., Fl. Bor. Amer. 2: 257. pl. 36. 1840. Columbia River, from Menzies Island upward, *Douglas.*

Sporobolus depauperatus Scribn., Bull. Torrey Bot. Club 9: 103. 1882. Based on *Vilfa depauperata* Torr.

Sporobolus aspericaulis Scribn., Bot. Gaz. 21: 15. 1896. Based on *Muhlenbergia aspericaulis* Nees.

Sporobolus richardsonii Merr., Rhodora 4: 46. 1902. Based on *Vilfa richarasonis* Trin.

Muhlenbergia richardsonis Rydb., Bull. Torrey Bot. Club 32: 600. 1905. Based on *Vilfa richardsonis* Trin.

Muhlenbergia brevifolia var. *richardsonis* Jones, Contrib. West. Bot. 14: 12. 1912. Based on *Vilfa richardsonis* Trin.

This is the species which Nash (Britton, Man. 105. 1901) called *Sporobolus brevifolius,* but that name is based on *Agrostis brevifolius* Nutt., which is *Muhlenbergia cuspidata* (which see).

(28) **Muhlenbergia sylvatica** Torr.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 292. 1841. Based on *Agrostis sylvatica* Torr.

Agrostis diffusa Muhl., Descr. Gram. 64. 1817. Not *A. diffusa* Host, 1809. Pennsylvania.

Agrostis sylvatica Torr., Fl. North. and Mid. U.S. 1: 87. 1823. Not *A. sylvatica* L., 1762. Mountains of New Jersey.

Muhlenbergia sylvatica var. *gracilis* Scribn., Kans. Acad. Sci. Trans. 9: 116. 1885. Topeka, Kans., *Popenoe.*

Muhlenbergia umbrosa Scribn., Rhodora 9: 20. 1907. Based on *Agrostis sylvatica* Torr.

Muhlenbergia umbrosa attenuata Scribn., Rhodora 9: 21. 1907. Aurora County, S.Dak., *Wilcox* 25.

Muhlenbergia diffusa Farwell, Mich. Acad. Sci. Rept. 20: 168. 1919. Not *M. diffusa* Willd., 1797. Based on *Agrostis diffusa* Muhl.

Muhlenbergia umbrosa forma *attenuata* Deam, Ind. Dept. Conserv. Pub. 82: 171. 1929. Based on *M. umbrosa attenuata* Scribn.

(23) **Muhlenbergia tenuiflora** (Willd.) B.S.P., Prel. Cat. N.Y. 67. 1888. Based on *Agrostis tenuiflora* Willd.

Agrostis tenuiflora Willd., Sp. Pl. 1: 364. 1797. North America.

Apera tenuiflora Beauv., Ess. Agrost. 151. 1812. Based on *Agrostis tenuiflora* Willd.

Trichochloa longiseta Trin., Fund. Agrost. 117. 1820. Based on *Agrostis tenuiflora* Willd. Erroneously given as *T. longiflora* Trin., in Kunth, Enum. Pl. 1: 601. 1833.

Cinna tenuiflora Link, Enum. Pl. 1: 71. 1821. Based on *Agrostis tenuiflora* Willd.

Muhlenbergia willdenowii Trin., Gram. Unifl. 188. pl. 5. f. 3. 1824. Based on *Agrostis tenuiflora* Willd.

Trichochloa tenuiflora Sweet, Hort. Brit. 443. 1826. Based on *Agrostis tenuiflora* Willd.

Podosaemum tenuiflorum Link, Hort. Berol. 1: 82. 1827. Based on *Agrostis tenuiflora* Willd.

Muhlenbergia tenuiflora variabilis Scribn., Rhodora 9: 18. 1907. Chimney Mountain, N.C., *Biltmore Herbarium* 654a.

(1) **Muhlenbergia texana** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 91. 1863. Northern Texas.

Agrostis barbata Buckl.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863. Not *A. barbata* Pers., 1805. As synonym of *Muhlenbergia texana* Buckl.

Muhlenbergia buckleyana Scribn., Contrib. U.S. Natl. Herb. 1: 56. 1890. Based on *M. texana* Buckl.

Podosaemum texanum Bush, Amer. Midl. Nat. 7: 41. 1921. Based on *Muhlenbergia texana* Buckl.

(8) **Muhlenbergia thurberi** Rydb., Bull. Torrey Bot. Club 32: 601. 1905. Based on *Sporobolus filiculmis* Vasey; Beal. *Vilfa filiculmis* Thurb., also cited, is a name only, and no reference is made to *Sporobolus thurberi* Scribn.

Sporobolus filiculmis Vasey, Descr. Cat. Grasses U.S. 44. 1885, name only; Vasey; Beal, Grasses N.Amer. 2: 288. 1896. Not *S. filiculmis* L. H. Dewey, 1894. New Mexico, Whipple Exped. [Plaza Larga, *Bigelow* 778].

Vilfa filiculmis Thurb.; Vasey, Descr. Cat. Grasses U.S. 44. 1885, as synonym of *Sporobolus filiculmis* Vasey.

Sporobolus thurberi Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 48. f. 5. 1898. "*Vilfa filiculmis* Thurb." Plaza Larga, N.Mex., *Bigelow.*

Vilfa filiculmis Thurb.; Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 48. 1898, as synonym of *Sporobolus thurberi* Scribn.

Muhlenbergia filiculmis Jones, Contrib. West. Bot. 14: 12. 1912. Not *M. filiculmis* Vasey, 1893. Based on *Vilfa filiculmis* Thurb., name only.

Muhlenbergia curtifolia griffithsii Scribn., Bull. Torrey Bot. Club 38: 328. 1911. De Chelly Canyon, Ariz., *Griffiths* 5837.

(14) **Muhlenbergia torreyana** (Schult.) Hitchc., Amer. Jour. Bot. 21: 136. 1934. Based on *Agrostis torreyana* Schult.

Agrostis compressa Torr., Cat. Pl. N.Y. 91. 1819. Not *A. compressa* Willd., 1790. New Jersey, *Goldy.*

Vilfa compressa Trin.; Spreng., Neu. Entd. 2: 58. 1821. Not *V. compressa* Beauv., 1812. North America.

Colpodium compressum Trin.; Spreng., Neu. Entd. 2: 58. 1821, as synonym of *Vilfa compressa* Trin.

Agrostis torreyana Schult., Mant. 2: 203. 1824. Based on *Agrostis compressa* Torr.

Sporobolus comprcssus Kunth, Enum. Pl. 1: 217. 1833. Based on *Agrostis compressa* Torr.

Sporobolus torreyanus Nash, in Britton, Man. 107. 1901. Based on *Agrostis torreyana* Schult.

(42) **Muhlenbergia torreyi** (Kunth) Hitchc.; Bush, Amer. Midl. Nat. 6: 84. 1919. Based on *Agrostis torreyi* Kunth.

Agrostis caespitosa Torr., Ann. Lyc. N.Y. 1: 152. 1824. Not *A. caespitosa* Salisb., 1796, nor *Muhlenbergia caespitosa* Chapm., 1878. Prairies of Missouri and Platte Rivers.

Agrostis torreyi Kunth, Rév. Gram. 1: Sup. XVII. 1830. Based on *A. caespitosa* Torr.

Muhlenbergia gracillima Torr., U.S. Rept. Expl. Miss. Pacif. 4: 155. 1856. Llano Estacado and near Antelope Hills, Canadian River, Tex. [*Bigelow.*]

Muhlenbergia nardifolia Griseb., Abh. Ges. Wiss. Göttingen 24: 294. 1879. Argentina.

Agrostis peckii House, Amer. Midl. Nat. 7: 126. 1921. Based on *A. caespitosa* Torr. The name misapplied to the awned form of *Agrostis hiemalis.*

Podosaemum gracillimum Bush, Amer. Midl. Nat. 7: 33. 1921. Based on *Muhlenbergia gracillima* Torr.

(15) **Muhlenbergia uniflora** (Muhl.) Fernald, Rhodora 29: 10. 1927. Based on *Poa uniflora* Muhl.

Poa? uniflora Muhl., Descr. Gram. 151. 1817. New England.

Agrostis serotina Torr., Fl. North. and Mid. U.S. 1: 88. 1823. Not *A. serotina* Lam., 1767. New Jersey.

Vilfa serotina Trin., Gram. Icon. 3: pl. 251. 1830. North America, "*Agrostis serotina* Nutt. ms."

Vilfa tenera Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4^1: 87. 1840. Boston, *Boott.*

Poa modesta Tuckerm., Amer. Jour. Sci. 45: 45. 1843. Cambridge, Mass. [*Tuckerman.*]

Sporobolus serotinus A. Gray, Man. 577. 1848. Based on *Agrostis serotina* Torr.

Sporobolus uniflorus Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 5. 1900. Based on *Poa uniflora* Muhl.

Poa stricta uniflora Muhl.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 5. 1900, as synonym of *Sporobolus uniflorus* Muhl.

Muhlenbergia uniflora var. *terrae-novae* Fernald, Rhodora 29: 11. 1927. Newfoundland, *Fernald, Long* and *Dunbar* 26244.

(6) **Muhlenbergia utilis** (Torr.) Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. Based on *Vilfa utilis* Torr.

Vilfa utilis Torr., U.S. Rept. Expl. Miss. Pacif. 5^2: 365. 1857. Between Tejon Pass and Lost Hills, Calif., [*Blake*].

Vilfa sacatilla Fourn., Mex. Pl. 2: 101. 1886. Chapultepec, Mexico, *Schaffner;* San Luis de Potosí, *Virlet* 1455; Texas, *Wright.*

Sporobolus sacatilla Griseb.; Fourn., Mex. Pl. 2: 101. 1886, as synonym of *Vilfa sacatilla* Fourn.

Sporobolus utilis Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 171. f. 467. 1899. Based on *Vilfa utilis* Torr.

(35) **Muhlenbergia virescens** (H.B.K.) Kunth, Rév. Gram. 1: 64. 1829. Based on *Podosaemum virescens* H.B.K.

Podosaemum virescens H.B.K., Nov. Gen. and Sp. 1: 132. 1815. Mexico, *Humboldt* and *Bonpland.*

Trichochloa virescens Roem. and Schult., Syst. Veg. 2: 389. 1817. Based on *Podosaemon virescens* H.B.K.

Muhlenbergia straminea Hitchc., Contrib. U.S. Natl. Herb. 17: 302. 1913. Chihuahua, Mexico, *Endlich* 1210.

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(11) **Muhlenbergia wrightii** Vasey in Coulter, Man. Rocky Mount. 409. 1885. Colorado and New Mexico, [type *Wright* 1986].
Muhlenbergia wrightii var. *annulata* Vasey, Descr. Cat. Grasses U.S. 41. 1885. Name only. [Arizona, *Lemmon* 3179.]
Muhlenbergia coloradensis Mez, Repert. Sp. Nov. Fedde 17: 213. 1921. "Chiann [Cheyenne] Canyon", Colo., *Jones* [806].

(106) MUNROA Torr.

(1) **Munroa squarrosa** (Nutt.) Torr., U.S. Rept. Expl. Miss. Pacif. 4^5 : 158. 1857. Based on *Crypsis squarrosa* Nutt.
Crypsis squarrosa Nutt., Gen. Pl. 1: 49. 1818. Grand detour of the Missouri River, [S.Dak., *Nuttall*].
Munroa squarrosa var. *floccuosa* Vasey; Beal, Grasses N.Amer. 2: 456. 1896. Arizona, [Peach Springs], *Jones*. (See p. 523.)
Nardus stricta L., Sp. Pl. 53. 1753. Europe.
Nassella major (Trin. and Rupr.) Desv., in Gay, Fl. Chil. 6: 265. 1853. Based on *Urachne major* Trin. and Rupr.
Urachne major Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5^1: 211. 1842. Chile.

(27) NEYRAUDIA Hook. f.

(1) **Neyraudia reynaudiana** (Kunth) Keng, in Hitchc., Amer. Jour. Bot. 21: 131. 1934. Based on *Arundo reynaudiana* Kunth.
Arundo reynaudiana Kunth, Rév. Gram. 2: 275. pl. 49. 1830. Burma, *Reynaud.*

(139) OLYRA L.

(1) **Olyra latifolia** L., Syst. Nat. ed. 10. 2: 1261. 1759. Jamaica, *Sloane.*
Olyra paniculata Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, *Swartz.*
Olyra arundinacea H.B.K., Nov. Gen. and Sp. 1: 197. 1816. Colombia, *Humboldt* and *Bonpland.*
Stipa latifolia Raspail, Ann. Sci. Nat., Bot. 5: 449. 1825. Based on *Olyra latifolia* L.
Olyra latifolia var. *arundinacea* Griseb., Fl. Brit. W.Ind. 535. 1864. Presumably based on *O. arundinacea* H.B.K.

(132) OPLISMENUS Beauv.[23]

Oplismenus hirtellus (L.) Beauv., Ess. Agrost. 54, 168, 170. 1812. Based on *Panicum hirtellum* L.
Panicum hirtellum L., Syst. Nat. ed. 10. 2: 870. 1759. Jamaica, [*Browne*].
This species is cultivated under the name *Panicum variegatum* Hort. (see Gard. Chron. 458. 1867).
(1) **Oplismenus setarius** (Lam.) Roem. and Schult., Syst. Veg. 2: 481. 1817. Based on *Panicum setarium* Lam.
Panicum setarium Lam., Tabl. Encycl. 1: 170. 1791. South America, *Commerson.*
Panicum velutinum G. Meyer, Prim. Fl. Esseq. 51. 1818. British Guiana [*Meyer*].
Orthopogon parvifolium Nutt., Gen. Pl. 1: 55, errata. 1818. Florida and South Carolina. On page 55 this is described under *Orthopogon hirtellus* Nutt., the name based on *Panicum hirtellum* L., but misapplied.
Setaria hirtella Schult., Mant. 2: 276. 1824. Based on the species described by Muhlenberg (Descr. Gram. 103. 1817) under the name *Panicum hirtellum.*
Orthopogon setarius Spreng., Syst. Veg. 1: 306. 1825. Based on *Panicum setarium* Lam.
Oplismenus parvifolius Kunth, Rév. Gram. 1: 45. 1829. Based on *Orthopogon parvifolium* Nutt.
Orthopogon hirtellus Eaton and Wright, N.Amer. Bot. ed. 8. 336. 1840. Southern States. No reference to Nuttall, nor synonym cited.
Panicum nuttallianum Steud., Nom. Bot. ed. 2. 2: 260. 1841. Based on *Orthopogon parvifolius* Nutt.

[23] For discussion of types see Hitchc., Contrib. U.S. Natl. Herb. 22: 126–130. 1920.

Oplismenus compositus var. *setarius* F. M. Bailey, Queensl. Grasses 19. 1888. Based on *Panicum setarium* Lam.
Hippagrostis setarius Kuntze, Rev. Gen. Pl. 2: 777. 1891. Based on *Panicum setarium* Lam.
Oplismenus hirtellus subsp. *setarius* Mez; Ekman, Arkiv Bot. 11^4: 26. 1912. Based on *Panicum setarium* Lam.

(34) ORCUTTIA Vasey

(3) **Orcuttia californica** Vasey, Bull. Torrey Bot. Club 13: 219. pl. 60. 1886. San Quentin Bay, Baja California, *Orcutt.*
(1) **Orcuttia greenei** Vasey, Bot. Gaz. 16: 146. 1891. Chico, Calif., *Greene.*
(2) **Orcuttia tenuis** Hitchc., Amer. Jour. Bot. 21: 131. 1934. Goose Valley, Shasta County, Calif., *Eastwood* 1013 (distributed in *Amer. Gr. Nat. Herb.* no. 686 as *Orcuttia californica*).

(111) ORYZA L.

(1) **Oryza sativa** L., Sp. Pl. 333. 1753. Africa and India.
Oryza sativa var. *rubribarbis* Desv., Jour. Bot. 1: 76. 1813. Cultivated in North America.
Oryza rubribarbis Steud., Nom. Bot. 577. 1821. Based on *O. sativa* var. *rubribarbis* Desv.
Oryza sativa var. *savannae* Koern., in Koern. and Wern., Handb. Getreidebau. 1: 233, 236. 1885. Cultivated, Savannah, Ga.

(82) ORYZOPSIS Michx.

(8) **Oryzopsis asperifolia** Michx., Fl. Bor. Amer. 1: 51. pl. 9. 1803. Hudson Bay to Quebec, *Michaux.*
Oryzopsis mutica Link, Enum. Pl. 1: 41. 1821. North America.
Urachne asperifolia Trin., Gram. Unifl. 174. 1824. Based on *Oryzopsis asperifolia* Michx.
Urachne leucosperma Link, Hort. Berol. 1: 94. 1827. Albany, N.Y.
Urachne mutica Steud., Nom. Bot. ed. 2. 2: 731. 1841. Based on *Oryzopsis mutica* Link.
Oryzopsis leucosperma Link; Walp., Ann. Bot. [London] 3: 728. 1853, as synonym of *Urachne asperifolia* Trin.
(10) **Oryzopsis bloomeri** (Boland.) Ricker; Piper, Contrib. U.S. Natl. Herb. 11: 109. 1906. Based on *Stipa bloomeri* Boland.
Stipa bloomeri Boland., Proc. Calif. Acad. 4: 168. 1872. Bloody Canyon, near Mono Lake, Calif., *Bolander* [6116].
Oryzopsis caduca Beal, Bot. Gaz. 15: 111. 1890. Belt Mountains, Mont., *Scribner.*
Stipa caduca Scribn., Contrib. U.S. Natl. Herb. 3: 54. 1892. Based on *Oryzopsis caduca* Beal.
Eriocoma caduca Rydb., Mem. N.Y. Bot. Gard. 1: 25. 1900. Based on *Stipa caduca* Scribn.
This is the species described by Beal (Grasses N.Amer. 2: 226. 1896) under the name *Oryzopsis sibirica* Beal, but the name is based on *Stipa sibirica* Lam., not known from America.
(6) **Oryzopsis canadensis** (Poir.) Torr., Fl. N.Y. 2: 433. 1843. Based on *Stipa canadensis* Poir.
Stipa juncea Michx., Fl. Bor. Amer. 1: 54. 1803. Not *S. juncea* L., 1753. Hudson Bay, Canada, *Michaux.*
Stipa canadensis Poir., in Lam., Encycl. 7: 452. 1806. Based on *S. juncea* Michx.
Urachne canadensis Torr. and Gray, Gram. and Cyp. Exsicc. no. 114. 1836. Based on *Stipa canadensis* Poir.
Oryzopsis juncea B.S.P., Prel. Cat. N.Y. 67. 1888. Based on *Stipa juncea* Michx.
Stipa macounii Scribn.; Macoun, Cat. Can. Pl. 2^5: 390. 1890. New Brunswick.
Oryzopsis macounii Beal, Grasses N.Amer. 2: 229. 1896. Based on *Stipa macounii* Scribn.
This is the species to which the name *Stipa richardsonii* Link was applied by A. Gray in the earlier editions of the Manual.

(4) **Oryzopsis exigua** Thurb., in Wilkes, U.S. Expl. Exped. Bot. 17: 481. 1874. Cascade Mountains, Oreg., *Wilkes Expl. Exped.*

(3) **Oryzopsis hendersoni** Vasey, Contrib. U.S. Natl. Herb. 1: 267. 1893. [Clements Mountain, near North Yakima],[24] *Henderson* 2249.

Oryzopsis exigua var. *hendersoni* Jones, Contrib. West. Bot. 14: 11. 1912. Based on *O. hendersoni* Vasey.

(12) **Oryzopsis hymenoides** (Roem. and Schult.) Ricker; Piper, Contrib. U.S. Natl. Herb. 11: 109. 1906. Based on *Stipa hymenoides* Roem. and Schult.

Stipa membranacea Pursh, Fl. Amer. Sept. 2: 728. 1814. Not *S. membranacea* L., 1753. Banks of the Missouri River, *Bradbury.*

Stipa hymenoides Roem. and Schult., Syst. Veg. 2: 339. 1817. Based on *Stipa membranacea* Pursh.

Eriocoma cuspidata Nutt., Gen. Pl. 1: 40. 1818. Grassy plains of the Missouri [type from "Platte Plains", *Nuttall*].

Milium cuspidatum Spreng., Syst. Veg. 1: 251. 1825. Based on *Eriocoma cuspidata* Nutt.

Urachne lanata Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 126. 1834. North America.

Eriocoma membranacea Steud., Nom. Bot. ed. 2. 1: 586. 1840, as synonym of *Urachne lanata* Trin.

Fendleria rhynchelytroides Steud., Syn. Pl. Glum. 1: 420. 1854. New Mexico, *Fendler* 979.

Oryzopsis cuspidata Benth.; Vasey, Grasses U.S. 23. 1883. Based on *Eriocoma cuspidata* Nutt.

Oryzopsis membranacea Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12^2: pl. 10. 1891. Based on *Stipa membranacea* Pursh.

Eriocoma membranacea Beal, Grasses N.Amer. 2: 232. 1896. Based on *Stipa membranacea* Pursh.

Eriocoma hymenoides Rydb., Bull. Torrey Bot. Club 39: 102. 1912. Based on *Stipa hymenoides* Roem. and Schult.

(7) **Oryzopsis kingii** (Boland.) Beal, Grasses N.Amer. 2: 229. 1896. Based on *Stipa kingii* Boland.

Stipa kingii Boland., Calif. Acad. Sci. Proc. 4: 170. 1872. Mount Dana, Calif., *Bolander* 6076 [error for 6097].

(2) **Oryzopsis micrantha** (Trin. and Rupr.) Thurb. Acad. Nat. Sci. Phila Proc. 1863: 78. 1863. Based on *Urachne micrantha* Trin. and Rupr.

Urachne micrantha Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5^1: 16. 1842. North America [type from Saskatchewan].

(1) **Oryzopsis miliacea** (L.) Benth. and Hook.; Aschers. and Schweinf., Mém. Inst. Égypte 2: 169. 1887. Presumably based on *Agrostis miliacea* L.

Agrostis miliacea L., Sp. Pl. 61. 1753. Europe.

Achnatherum miliaceum Beauv., Ess. Agrost. 20, 146, 148. 1812. Based on *Agrostis miliacea* L.

Piptatherum miliaceum Coss., Notes Crit. 129. 1851. Based on *Agrostis miliacea* L.

(5) **Oryzopsis pungens** (Torr.) Hitchc., Contrib. U.S. Natl. Herb. 12: 151. 1908. Based on *Milium pungens* Torr.

Milium pungens Torr.; Spreng., Neu. Entd. 2: 102. 1821. "Schenectady in Massachusetana." [Error for New York.]

Oryzopsis parviflora Nutt., Jour. Acad. Nat. Sci. Phila. 3: 125. 1823. Bellows Falls, Vt.

Panicum firmum Kunth, Rév. Gram. 1: 37. 1829. Based on *Milium pungens* Torr.

Urachne brevicaudata Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 127. 1834. Lake Winnipeg, Canada.

Urachne canadensis Torr. and Gray; Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Natl. 5^1: 17. 1842, as synonym of *Urachne brevicaudata* Trin.

(9) **Oryzopsis racemosa** (J. E. Smith) Ricker; Hitchc., Rhodora 8: 210. 1906. Based on *Milium racemosum* J. E. Smith.

Milium racemosum J. E. Smith, in Rees's Cycl. 23: Milium no. 15. 1813. Lancaster, Pa., *Muhlenberg.*

Oryzopsis melanocarpa Muhl., Descr. Gram. 79. 1817. Pennsylvania, *Muhlenberg.*

Piptatherum nigrum Torr., Fl. North. and Mid. U.S. 1: 79. 1823. Williamstown and Deerfield, Mass.; Kingston and Fishkill Mountains, N.Y.; Pennsylvania, *Muhlenberg.*

[24] See Piper, Contrib. U.S. Natl. Herb. 11: 109. 1906.

Urachne racemosa Trin., Gram. Unifl. 174. 1824. Based on *Milium racemosum* J. E. Smith.

Urachne melanosperma Link, Hort. Berol. 1: 94. 1827. Based on *Oryzopsis melanocarpa* Muhl.

(11) **Oryzopsis webberi** (Thurb.) Benth.; Vasey, Grasses U.S. 23. 1883. Based on *Eriocoma webberi* Thurb.

Eriocoma webberi Thurb., in S. Wats., Bot. Calif. 2: 283. 1880. Sierra Valley, Calif., *Bolander*.

(129) PANICUM L.[25]

(14) **Panicum aciculare** Desv.; Poir., in Lam., Encycl. Sup. 4: 274. 1816. "Indes orientales", erroneous; probably from southeastern United States.

Panicum setaceum Muhl., Descr. Gram. 99. 1817. Georgia.

Panicum subuniflorum Bosc; Spreng., Syst. Veg. 1: 312. 1825. Carolina, *Bosc*.

Panicum arenicola Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 56. 1898. Chapel Hill, N.C., *Ashe*.

Panicum pungens Muhl.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 27: 2. 1900. Not *P. pungens* Poir., 1816. As synonym of *P. setaceum* Muhl.

Panicum filirameum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 88. 1900. New Hanover County, N.C., *Ashe*.

This is the species described in Britton's Manual and in Small's Flora (ed. 1) under the name *Panicum neuranthum* Griseb.

(100) **Panicum aculeatum** Hitchc. and Chase, Rhodora 8: 209. 1906. District of Columbia, *Chase* 2520.

(65) **Panicum addisonii** Nash, Bull. Torrey Bot. Club 25: 83. 1898. Wildwood, N.J., *Bicknell* in 1897.

Panicum owenae Bicknell, Bull. Torrey Bot. Club 35: 185. 1908. Nantucket, Mass., *Bicknell* in 1907.

Panicum commonsianum addisonii Stone, N.J. State Mus. Ann. Rept. 1910: 205. 1911. Based on *P. addisonii* Nash.

(116) **Panicum adspersum** Trin., Gram. Pan. 146. 1826. Dominican Republic.

Panicum thomasianum Steud.; Doell, in Mart., Fl. Bras. 2[2]: 188. 1877, as synonym of *P. adspersum*. St. Thomas, *Duchaissing*.

Panicum keyense Mez, Notizbl. Bot. Gart. Berlin 7: 61. 1917. Sand Key, Fla., *Curtiss* 3606**, 5431, 6705.

This is the species described as *Panicum striatum* Lam. by Chapman (Fl. South. U.S. ed. 2. 666. 1883).

(147) **Panicum agrostoides** Spreng., Pl. Pugill. 2: 4. 1815. Pennsylvania, *Muhlenberg*.

Panicum rigidulum Bosc; Spreng., Syst. Veg. 1: 320. 1825; Nees, Agrost. Bras. 163. 1829. [South Carolina? *Bosc*.]

Agrostis polystachya Bosc; Steud., Nom. Bot. ed. 2. 1: 40. 1840, erroneously cited as synonym of *A. composita* Poir. [Carolina, *Bosc*.]

Panicum elongatum var. *ramosior* Mohr, Contrib. U.S. Natl. Herb. 6: 357. 1901. Near Mobile, Ala., [*Mohr*].

(44) **Panicum albemarlense** Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 84. 1900. Scranton, Hyde County, N.C., *Ashe* in 1899.

Panicum velutinum Bosc; Spreng., Syst. Veg. 1: 315. 1825. Not *P. velutinum* Meyer, 1818. Name only. [*Bosc*.]

Panicum meridionale var. *albemarlense* Fernald, Rhodora 36: 76. 1934. Based on *P. albemarlense* Ashe.

(74) **Panicum albomarginatum** Nash, Bull. Torrey Bot. Club 24: 40. 1897. Eustis, Fla., *Nash* 925.

(145) **Panicum amarulum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 96. f. 87. 1910. Virginia Beach, Va., *Williams* 3090.

(144) **Panicum amarum** Ell., Bot. S.C. and Ga. 1: 121. 1816. Presumably South Carolina.

Panicum amarum var. *minus* Vasey and Scribn., U.S.Dept.Agr., Div. Bot. Bull. 8: 38. 1889. Fortress Monroe, Va., *Vasey*.

Panicum amaroides Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 29: 5. f. 1. 1901. Based on *P. amarum* var. *minus* Vasey and Scribn.

[25] For discussion of types see Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 23–327. 1910; 17: 465–522. 1915.

Chasea amara Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum amarum* Ell.

(152) **Panicum anceps** Michx., Fl. Bor. Amer. 1: 48. 1803. Carolina, *Michaux.*

Panicum rostratum Muhl.; Willd., Enum. Pl. 1032. 1809. Pennsylvania [type, *Muhlenberg*] and Carolina.

Agrostis nutans Poir., in Lam., Encycl. Sup. 1: 255. 1810. Carolina, *Bosc.*

Vilfa nutans Beauv., Ess. Agrost. 16, 148, 181. 1812. Based on *Agrostis nutans* Poir.

Panicum nutans Desv., Opusc. 93. 1831. Based on *Agrostis nutans* Poir.

Panicum anceps var. *angustum* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 37. 1889. Texas, *Nealley.*

Panicum anceps var. *densiflorum* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 37. 1889. [Marshall], Tex., *Riggs* [91].

(17) **Panicum angustifolium** Ell., Bot. S.C. and Ga. 1: 129. 1816. Presumably South Carolina.

?*Panicum ramulosum* Michx., Fl. Bor. Amer. 1: 50. 1803. Carolina, *Michaux.*

Panicum curtisii Steud., Syn. Pl. Glum. 1: 66. 1854. South Carolina, *M. A. Curtis.*

Chasea angustifolia Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum angustifolium* Ell.

(27) **Panicum annulum** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 58. 1898. Maryland to North Carolina and Georgia, Washington, D.C., *Ward* in 1892 [type].

Panicum bogueanum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 85. 1900. Based on *P. annulum* Ashe.

(19) **Panicum arenicoloides** Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 89. 1900. Wilmington, N.C., *Ashe* in 1899.

Panicum orthophyllum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 90. 1900. New Hanover County, N.C., *Ashe* in 1899.

(117) **Panicum arizonicum** Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 2. 1901. Camp Lowell, Ariz., *Pringle* 465.

Panicum fuscum var. *majus* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 26. 1889. Mexico [southwestern Chihuahua, *Palmer* 1b in 1885].

Panicum dissitiflorum Vasey, in S. Wats., Amer. Acad. Sci. Proc. 24: 80. 1889. Name only. Guaymas, Mexico, *Palmer* 159 in part, 190.

Panicum fasciculatum var. *majus* Beal, Grasses N.Amer. 2: 117. 1896. Based on *P. fuscum* var. *majus* Vasey.

Panicum fasciculatum dissitiflorum Vasey; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 2. 1901, as synonym of *P. arizonicum.*

Panicum arizonicum tenue Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 3. 1901. Fort Huachuca, Ariz., *Wilcox* in 1894.

Panicum arizonicum laeviglume Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 3. 1901. Mescal, Ariz., *Griffiths* 1810.

Panicum arizonicum majus Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 3. 1901. Based on *P. fuscum* var. *majus* Vasey.

(103) **Panicum ashei** Pearson; Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 35. 1898. Ithaca, N.Y., *Ashe* in 1898.

Panicum umbrosum LeConte; Torr., in Eaton, Man. Bot. 342. 1818. Not *P. umbrosum* Retz., 1786. New York.

Panicum commutatum var. *ashei* Fernald, Rhodora 36: 83. 1934. Based on *P. ashei* Pearson.

(49) **Panicum auburne** Ashe, N.C. Agr. Expt. Sta. Bull. 175: 115. 1900. Auburn, Ala., *Earle* and *Baker* 1527.

(32) **Panicum barbulatum** Michx., Fl. Bor. Amer. 1: 49. 1803. "Carolina" [but type from Canada].

Panicum dichotomum var. *barbulatum* Wood, Class-book ed. 3. 786. 1861. Presumably based on *P. barbulatum* Michx.

Panicum pubescens var. *barbulatum* Britton, Cat. Pl. N.J. 280. 1889. Presumably based on *P. barbulatum* Michx.

Panicum nitidum var. *barbulatum* Chapm., Fl. South. U.S. ed. 3. 586. 1897. Based on *P. barbulatum* Michx.

Panicum gravius Hitchc. and Chase, Rhodora 8: 205. 1906. Between Centreville and Mount Cuba, Del., *Chase* 3620.

(120) **Panicum bartowense** Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 3. 1901. Bartow, Fla., *Combs* 1220.

Panicum bergii Arech., An. Mus. Nac. Montevideo 1: 147. 1894. Uruguay.

(22) **Panicum bicknellii** Nash, Bull. Torrey Bot. Club 24: 193. 1897. Bronx Park, N.Y., *Bicknell* in 1895.

Panicum nemopanthum Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 42. 1898. Raleigh N.C., *Ashe* in 1895.

Panicum bushii Nash, Bull. Torrey Bot. Club 26: 568. 1899. McDonald County, Mo., *Bush* 413.

Panicum bicknellii var. *bushii* Farwell, Mich. Acad. Sci. Papers 1: 85. 1921. Based on *P. bushii* Nash.

(30) **Panicum boreale** Nash, Bull. Torrey Bot. Club 22: 421. 1895. Cairo, N.Y., *Nash* in 1893.

(110) **Panicum boscii** Poir., in Lam., Encycl. Sup. 4: 278. 1816. Carolina, *Bosc.*

Panicum waltheri Poir., in Lam., Encycl. Sup. 4: 282. 1816. Not *P. walteri* Pursh, 1814. Based on *P. latifolium* as described by Michaux.

Panicum latifolium var. *australe* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 34. 1889. Alabama [type, Thomasville, *Mohr*] to Texas.

Panicum porterianum Nash, Bull. Torrey Bot. Club 22: 420. 1895. Based on *P. waltheri* Poir.

Panicum boscii var. molle (Vasey) Hitchc. and Chase, in Robinson, Rhodora 10: 64. 1908. Based on *P. latifolium* var. *molle* Vasey.

Panicum latifolium var. *molle* Vasey; Ward, Fl. Washington 135. 1881. District of Columbia, [*Ward*].

Panicum walteri var. *molle* Porter, Bull. Torrey Bot. Club 20: 194. 1893. Presumably based on *P. latifolium* var. *molle* Vasey.

Panicum pubifolium Nash, Bull. Torrey Bot. Club 26: 577. 1899. Based on *P. latifolium* var. *molle* Vasey.

(156) **Panicum brachyanthum** Steud., Syn. Pl. Glum. 1: 67. 1854. [Rusk County], Tex., *Vinzent* 124.

Panicum sparsiflorum Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 36. 1889. Not *P. sparsiflorum* Doell, 1877. South Carolina to Texas, [type, San Bernardino, *Ridell* 20].

This species was described as *Panicum angustifolium* Ell. by Chapman (Fl. South. U.S. 574. 1860).

(83) **Panicum breve** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 271. f. 301. 1910. Jensen, Fla., *Hitchcock* 734.

(139) **Panicum bulbosum** H.B.K., Nov. Gen. and Sp. 1: 99. 1815. Guanajuato, Mexico, *Humboldt* and *Bonpland.*

Panicum avenaceum H.B.K., Nov. Gen. and Sp. 1: 99. 1815. Ecuador, *Humboldt* and *Bonpland.*

Panicum gongylodes Jacq., Eclog. Gram. 30. pl. 21. 1815–1820. Cultivated at Vienna.

Panicum nodosum Willd.; Steud., Nom. Bot. ed. 2. 2: 260. 1841, as synonym of *P. bulbosum.*

Panicum maximum var. *gongylodes* Doell, in Mart., Fl. Bras. 2^2: 203. 1877. Based on *P. gongylodes* Jacq.

Panicum maximum var. *bulbosum* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 295. 1878. Presumably based on *P. bulbosum* H.B.K.

Panicum polygamum var. *gongylodes* Fourn., Mex. Pl. 2: 28. 1886. Based on *P. gongylodes* Jacq.

Panicum bulbosum subvar. *violaceum* Fourn., Mex. Pl. 2: 27. 1886. Chinantla, Mexico, *Liebmann* 451.

Panicum bulbosum var. *avenaceum* Beal, Grasses N.Amer. 2: 132. 1896. Based on *P. avenaceum* H.B.K.

Panicum bulbosum var. minus Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 38. 1889. Texas, New Mexico, and Arizona [type New Mexico, *Rusby* in 1880].

Panicum sciaphilum Rupr.; Fourn., Mex. Pl. 2: 19. 1886. Yavesia, Mexico, *Galeotti* 5759.

Panicum bulbosum sciaphilum Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 83. f. 73. 1910. Based on *P. sciaphilum* Rupr.

(35) **Panicum caerulescens** Hack.; Hitchc., Contrib. U.S. Natl. Herb. 12: 219. 1909. Miami, Fla., *Hitchcock* 706.

(23) **Panicum calliphyllum** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 31. 1898. Watkins, N.Y., *Ashe* in 1898.

(125) **Panicum capillare** L., Sp. Pl. 58. 1753. Virginia, [*Clayton* 454].

Milium capillare Moench, Meth. Pl. 203. 1794. Based on *P. capillare* L.

Panicum bobarti Lam., Encycl. 4: 748. 1798. [Virginia, *Bobart.*]

Panicum capillare var. *agreste* Gattinger, Tenn. Fl. 94. 1887. Tennessee, [Ridgetop, *Gattinger*].

Panicum capillare var. *vulgare* Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 44. 1894. Presumably Knoxville, Tenn.

Chasea capillaris Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum capillare* L.

Leptoloma capillaris Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum capillare* L.

PANICUM CAPILLARE var. OCCIDENTALE Rydb., Contrib. U.S. Natl. Herb. 3: 186. 1895. Whitman, Nebr., *Rydberg* 1788.

Panicum capillare brevifolium Vasey; Rydb. and Shear, U.S.Dept.Agr., Div. Agrost. Bull. 5: 21. 1897. Manhattan, Mont., *Shear* 436.

Panicum barbipulvinatum Nash, in Rydb., Mem. N.Y. Bot. Gard. 1: 21. 1900. Based on *P. capillare* var. *brevifolium* Vasey.

Leptoloma barbipulvinata Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum barbipulvinatum* Nash.

Milium barbipulvinatum Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Panicum barbipulvinatum* Nash.

Panicum barbipulvinatum var. *hirsutipes* Suksdorf, Werdenda 1: 17. 1927. Spokane, Wash., *Suksdorf* 9068.

Panicum elegantulum Suksdorf, Werdenda 1: 16. 1927. Not *P. elegantulum* Mez, 1917. Spokane, Wash., *Suksdorf* 9069. (No. 11792, also cited, is *P. capillare*.)

(131) **Panicum capillarioides** Vasey, in Coulter, Contrib. U.S. Natl. Herb. 1: 54. 1890. Point Isabel, Tex., *Nealley* [634].

(81) **Panicum chamaelonche** Trin., Gram. Pan. 242. 1826. North America, *Enslin.*

Panicum nitidum var. *minus* Vasey, Contrib. U.S. Natl. Herb. 3: 30. 1892. Florida, [type, St. Augustine, *Canby*].

Panicum baldwinii Nutt.; Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 1: 21. 1895, name only; Chapm. Fl. South U.S. ed. 3. 586. 1897. Florida, *Baldwin.*

Panicum dichotomum var. *nitidum* Chapm.; Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 43. 1898, as synonym of *P. baldwinii.*

(1) **Panicum chapmani** Vasey, Bull. Torrey Bot. Club 11: 61. 1884. Southern Florida, *Chapman.*

This is the species described as *Panicum tenuiculmum* Meyer by Chapman (Fl. South. U.S. 572. 1860).

(15) **Panicum chrysopsidifolium** Nash, in Small, Fl. Southeast. U.S. 100, 1327. 1903. Leon County, Fla., *Curtiss* (no. D).

(11) **Panicum ciliatum** Ell., Bot. S.C. and Ga. 1: 126. 1816. Presumably South Carolina.

Panicum leucoblepharis Trin., Clav. Agrost. 234. 1822. North America, [type, *Enslin*].

Panicum ciliatifolium Kunth, Rév. Gram. 1: 36. 1829. Based on *P. ciliatum* Ell.

Panicum ciliatifolium Desv., Opusc. 88. 1831. North America.

(108) **Panicum clandestinum** L., Sp. Pl. 58. 1753. Pennsylvania, *Kalm.*

Milium clandestinum Moench, Meth. Pl. 204. 1794. Based on *Panicum clandestinum* L.

Panicum latifolium var. *clandestinum* Pursh, Fl. Amer. Sept. 1: 68. 1814. Based on *P. clandestinum* L.

Panicum pedunculatum Torr., Fl. North. and Mid. U.S. 141. 1823. "Island of New York."

Panicum clandestinum var. *pedunculatum* Torr., Fl. N.Y. 2: 426. 1843. Based on *P. pedunculatum* Torr.

Panicum decoloratum Nash, Bull. Torrey Bot. Club 26: 570. 1899. Tullytown, Pa., *Bicknell* in 1899.

Chasea clandestina Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum clandestinum* L.

(29) **Panicum clutei** Nash, Bull. Torrey Bot. Club 26: 569. 1899. Between Tuckerton and Atsion, N.J., *Clute.*

(68) **Panicum columbianum** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7: 78. f. 60. 1897. District of Columbia, *Scribner* in 1894.

Panicum heterophyllum Bosc; Nees, Agrost. Bras. 227. 1829. Not *P. heterophyllum* Spreng., 1822. North America, *Bosc.*

Panicum psammophilum Nash, Bull. Torrey Bot. Club 26: 576. 1899. Not *P. psammophilum* Welw., 1899. Toms River, N.J., *Clute* 175.

PANICUM COLUMBIANUM var. THINIUM Hitchc. and Chase, in Robinson, Rhodora 10: 64. 1908. Based on *P. unciphyllum thinium* Hitchc. and Chase.

Panicum unciphyllum thinium Hitchc. and Chase, Rhodora 8: 209. 1906. Toms River, N.J., *Chase* 3577.

Panicum heterophyllum var. *thinium* F. T. Hubb., Rhodora 14: 172. 1912. Based on *P. unciphyllum thinium* Hitchc. and Chase.

(151) **Panicum combsii** Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 42. f. 16. 1901. Chipley, Fla., *Combs* 583.

Panicum longifolium var. *combsii* Fernald, Rhodora 36: 69. 1934. Based on *P. combsii* Scribn. and Ball.

(64) **Panicum commonsianum** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 55. 1898. Cape May, N.J., *Commons* 341.

(104) **Panicum commutatum** Schult., Mant. 2: 242. 1824. Based on *P. nervosum* Muhl.

Panicum nitidum var. *majus* Pursh, Fl. Amer. Sept. 1: 67. 1814. North America.

Panicum nervosum Muhl.; Ell., Bot. S.C. and Ga. 1: 122. 1816. Not *P. nervosum* Lam., 1797. Carolina and Georgia.

Panicum enslini Trin., Gram. Pan. 230. 1826. North America, *Enslin*.

Panicum polyneuron Steud., Syn. Pl. Glum. 1: 91. 1854. Based on *P. nervosum* Muhl.

Panicum commutatum var. *minus* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 34. 1889. Southern States [type, Aiken, S.C., *Ravenel*].

Panicum commutatum var. *latifolium* Scribn., in Kearney, Bull. Torrey Bot. Club 20: 476. 1893. Pine Mountain, Ky., *Kearney* 299.

Panicum commelinaefolium Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 29. 1898. Not *P. commelinaefolium* Rudge, 1805. Stone Mountain, Ga., *Small* in 1895.

Panicum currani Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 113. 1899. Based on *P. commelinaefolium* Ashe.

Panicum subsimplex Ashe, N.C. Agr. Expt. Sta. Bull. 175: 115. 1900. Wilmington, Del., *Commons*.

(77) **Panicum concinnius** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 263. f. 289. 1910. Based on *P. gracilicaule* Nash.

Panicum gracilicaule Nash, in Small, Fl. Southeast. U.S. 98. 1903. Not *P. gracilicaule* Rendle, 1899. Sand Mountain, Ala., *Harbison* 2415.

(148) **Panicum condensum** Nash, in Small, Fl. Southeast. U.S. 93. 1903. [Jacksonville], Fla., *Curtiss* 5576.

Agrostis purpurascens Bert.; Steud., Nom. Bot. ed. 2. 1: 42. 1840. Not *A. purpurascens* Swartz, 1788. Name only. Dominican Republic, *Bertero, Balbis*.

Panicum contractum Trin.; Steud., Nom. Bot. ed. 2. 2: 254. 1841. Name only. Guadeloupe and Dominican Republic, *Balbis*.

Panicum agrostoides var. *condensum* Fernald, Rhodora 36: 74. 1934. Based on *P. condensum* Nash.

(16) **Panicum consanguineum** Kunth, Rév. Gram. 1: 36. 1829. Based on *P. villosum* Ell.

Panicum villosum Ell., Bot. S.C. and Ga. 1: 124. 1816. Not. *P. villosum* Lam., 1791. Presumably South Carolina.

Panicum commutatum var. *consanguineum* Beal, Grasses N.Amer. 2: 141. 1896. Based on *P. consanguineum* Kunth.

Panicum georgianum Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 36. 1898. Darien Junction, Ga., *Small* in 1895.

Panicum cahoonianum Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 113. 1899. Based on *P. georgianum* Ashe.

(102) **Panicum cryptanthum** Ashe, N.C. Agr. Expt. Sta. Bull. 175: 115. 1900. Wilsons Mills, N.C., *Ashe* in 1897.

(80) **Panicum curtifolium** Nash, Bull. Torrey Bot. Club 26: 569. 1899. Ocean Springs, Miss., *Tracy* 4598.

Panicum earlei Nash, Bull. Torrey Bot. Club 26: 571. 1899. Auburn, Ala., *Earle* and *Baker* 1532.

Panicum austro-montanum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 85. 1900. Northern Alabama and adjacent parts of Tennessee, *Ashe*.

(63) **Panicum deamii** Hitchc. and Chase, in Deam, Ind. Dept. Conserv. Pub. 82: 284. pl. 75. f. 18. 1929. Pine, Lake County, Ind., *Deam* 43287.

(5) **Panicum depauperatum** Muhl., Descr. Gram. 112. 1817. Pennsylvania, Carolina [type].

Panicum strictum Pursh, Fl. Amer. Sept. 1: 69. 1814. Not *P. strictum* R. Br., 1810. Pennsylvania.

Panicum rectum Roem. and Schult., Syst. Veg. 2: 457. 1817. Based on *P. strictum* Pursh.
Panicum involutum Torr., Fl. North. and Mid. U.S. 144. 1823. Deerfield, Mass., *Cooley*.
Panicum muhlenbergii Spreng., Syst. Veg. 1: 314. 1825. North America. [Type, New Jersey, *Torrey*].
Panicum junceum Trin., Gram. Pan. 220. 1826. North America.
Panicum sprengelii Kunth, Rév. Gram. 1: 39. 1829. Based on *P. muhlenbergii* Spreng.
Panicum depauperatum var. *involutum* Wood, Class-book 786. 1861. Based on *P. involutum* Torr.
?*Panicum depauperatum* var. *laxum* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 29. 1889. "Virginia, Florida, Texas, Arkansas, Missouri."
Panicum depauperatum var. *psilophyllum* Fernald, Rhodora 23: 193. 1921. Canton, Maine, *Parlin* 1957.

(119) **Panicum dichotomiflorum** Michx., Fl. Bor. Amer. 1: 48. 1803. Western Allegheny Mountains, *Michaux*.
Panicum miliaceum Walt., Fl. Carol. 72. 1788. Not *P. miliaceum* L., 1753. South Carolina.
Panicum geniculatum Muhl., Cat. Pl. 9. 1813. Based on *P. dichotomiflorum* Michx.
Panicum multiflorum Poir., in Lam., Encycl. Sup. 4: 282. 1816. Carolina, *Bosc*.
Panicum brachiatum Bosc; Spreng., Syst. Veg. 1: 321. 1825. Not *P. brachiatum* Poir. Bermuda cited [but type probably from South Carolina, *Bosc*].
Panicum elliottii Trin.; Nees, Agrost. Bras. 170. 1829, as synonym of *P. proliferum* Lam. [misapplied to *P. dichotomiflorum*].
Panicum retrofractum Delile; Desv., Opusc. 96. 1831. North America. [Type from Carolina.]
Panicum proliferum var. *pilosum* Griseb., Cat. Pl. Cub. 232. 1866. Habana, Cuba, *Wright* [186].
Panicum proliferum var. *geniculatum* Wood, Amer. Bot. and Flor. pt. 2: 392. 1870. Presumably based on *P. geniculatum* Muhl.
Panicum amplectans Chapm., Bot. Gaz. 3: 20. 1878. South Florida, [*Blodgett*].
Leptoloma dichotomiflora Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum dichotomiflorum* Michx.
This species has been referred to *P. proliferum* Lam., an Old World species.

Panicum dichotomiflorum var. puritanorum Svenson, Rhodora 22: 154. f. 1–5. 1920. Barnstable, Mass., *Fernald* in 1919.

(31) **Panicum dichotomum** L., Sp. Pl. 58. 1753. Virginia, [*Clayton* 458].
Panicum angustifolium LeConte; Torr., in Eaton, Man. Bot. ed. 2: 342. 1818. Not *P. angustifolium* Ell., 1816. New York.
Panicum tremulum Spreng., Neu. Entd. 2: 103. 1821. New Jersey [*Torrey*].
Panicum dichotomum var. *viride* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 30. 1889. No locality cited. [Type, Washington, D.C., *Ward* in 1881.]
Panicum dichotomum var. *divaricatum* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 30. 1889. No locality cited. [Type, Lake, Miss., *Tracy* 127.]
Panicum nitidum var. *pauciflorum* Britton, N.Y. Acad. Sci. Trans. 9: 14. 1889. Morris County, N.J., *Britton*.
Panicum nitidum var. *viride* Britton, N.Y. Acad. Sci. Trans. 9: 14. 1889. Based on *P. dichotomum* var. *viride* Vasey.
Panicum dichotomum var. *commune* Wats. and Coult., in A. Gray, Man. ed. 6: 633. 1890. No locality cited.
Panicum ramulosum var. *viride* Porter, Bull. Torrey Bot. Club 20: 194. 1893. Presumably based on *P. dichotomum* var. *viride* Vasey.
Chasea dichotoma Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum dichotomum* L.

(78) **Panicum ensifolium** Baldw.; Ell., Bot. S.C. and Ga. 1: 126. 1816. Georgia, *Baldwin*.
Panicum nitidum var. *ensifolium* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 29. 1889. Based on *P. ensifolium* Baldw.
Panicum brittoni Nash, Bull. Torrey Bot. Club 24: 194. 1897. Forked River, N.J., *Britton* in 1896.
Panicum cuthbertii Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 48. 1898. St. Helena Island, S.C., *Cuthbert*.

Panicum glabrissimum Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 62. 1898. Manteo, N.C., *Ashe* in 1898.
Panicum shallotte Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 84. 1900. Based on *P. glabrissimum* Ashe.
Panicum parvipaniculatum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 87. 1900. Onslow County, N.C., *Ashe* in 1899.

(107) **Panicum equilaterale** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 42. pl. 2. 1898. Eustis, Fla., *Nash* 1674.
Panicum epilifolium Nash, Bull. Torrey Bot. Club 26: 571. 1899. Eustis, Fla., *Nash* 45.

(72) **Panicum erectifolium** Nash, Bull. Torrey Bot. Club 23: 148. 1896. Based on *P. sphaerocarpon* var. *floridanum* Vasey.
Panicum sphaerocarpon var. *floridanum* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 33. 1889. Not *P. floridanum* Trin., 1834. Florida, [type, Mosquito Inlet, *Curtiss* 3599].
Panicum floridanum Chapm., Fl. South. U.S. ed. 3. 585. 1897. Not *P. floridanum* Trin., 1834. Presumably based on *P. sphaerocarpon* var. *floridanum* Vasey.

(115) **Panicum fasciculatum** Swartz, Prodr. Veg. Ind. Occ. 22. 1788. Jamaica, *Swartz.*
Panicum chartaginense Swartz, Prodr. Veg. Ind. Occ. 22. 1788. Cartagena, Colombia.
Panicum fuscum Swartz, Prodr. Veg. Ind. Occ. 23. 1788. Jamaica, *Swartz.*
Panicum flavescens Swartz, Prodr. Veg. Ind. Occ. 23. 1788. Jamaica, *Swartz.*
Panicum fusco-rubens Lam., Tabl. Encycl. 1: 171. 1791. West Indies.
Panicum fastigiatum Poir., in Lam., Encycl. Sup. 4: 277. 1816. Based on *P. fasciculatum* Swartz.
Panicum spithamaeum Willd.; Nees, Agrost. Bras. 152. 1829. Name only. South America, *Humboldt.*
Panicum illinoniense Desv., Opusc. 91. 1831. North America.
Panicum reticulatum Griseb., Abhandl. Gesell. Wiss. Göttingen 7: 264. 1857. Not *P. reticulatum*, Torr. 1852. West Indies or Panama.
Panicum fuscum var. *fasciculatum* Griseb., Fl. Brit. W.Ind. 547. 1864. Based on *P. fasciculatum* Swartz.
Panicum fasciculatum var. *flavescens* Doell, in Mart., Fl. Bras. 2^2: 205. 1877. Based on *P. flavescens* Swartz.
Panicum fasciculatum var. *fuscum* Doell, in Mart., Fl. Bras. 2^2: 205. 1877. Based on *P. fuscum* Swartz.
Panicum fasciculatum var. *carthaginense* Doell, in Mart., Fl. Bras. 2^2: 205. 1877. Based on *P. chartaginense* Swartz.

PANICUM FASCICULATUM VAR. RETICULATUM (Torr.) Beal, Grasses N.Amer. 2: 117. 1896. Based on *P. reticulatum* Torr.
Panicum reticulatum Torr., in Marcy, Expl. Red Riv. 299. 1852. Red River, Tex.
Panicum fuscum reticulatum Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 4. 1901. Based on *P. reticulatum* Torr.

(132) **Panicum filipes** Scribn., in Heller, Contrib. Herb. Frankl. Marsh. Coll. 1:13. 1895. Corpus Christi, Tex., *Heller* 1809.

(4) **Panicum firmulum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 27. f. 9. 1910. Elsordo, Tex., *Griffiths* 6446.

(76) **Panicum flavovirens** Nash, Bull. Torrey Bot. Club 26: 572. 1899. Lake County, Fla., *Nash* 2061.

(121) **Panicum flexile** (Gattinger) Scribn., in Kearney, Bull. Torrey Bot. Club 20: 476. 1893. Based on *P. capillare* var. *flexile* Gattinger.
Panicum capillare var. *flexile* Gattinger, Tenn. Fl. 94. 1887. [Nashville, Tenn., *Gattinger.*]
Chasea flexilis Nieuwl., Amer. Midl. Nat. 2: 65. 1911. Based on *Panicum flexile* Scribn.

(18) **Panicum fusiforme** Hitchc., Contrib. U.S. Natl. Herb. 12: 222. 1909. Based on *P. neuranthum* var. *ramosum* Griseb.
Panicum neuranthum var. *ramosum* Griseb., Cat. Pl. Cub. 232. 1866. Not *P. ramosum* L., 1767. Western Cuba, *Wright* 3454.

(122) **Panicum gattingeri** Nash, in Small, Fl. Southeast. U.S. 92, 1327. 1903. Based on *P. capillare* var. *campestre* Gattinger.
Panicum capillare var. *campestre* Gattinger, Tenn. Fl. 94. 1887. Not *P. campestre* Nees. [Nashville, Tenn., *Gattinger.*]

Panicum capillare var. *geniculatum* Scribn., in Kearney, Bull. Torrey Bot. Club 20: 447. 1893. Wasioto, Ky., [*Kearney* 378].

Panicum capillare gattingeri Nash, in Britt. and Brown, Illustr. Fl. 1: 123. 1896. Based on *P. capillare* var. *campestre* Gattinger.

(111) **Panicum geminatum** Forsk., Fl. Aegypt. Arab. 18. 1775. Rosetta, Egypt.

Paspalum appressum Lam., Tabl. Encycl. 1: 176. 1791. South America.

Digitaria appressa Pers., Syn. Pl. 1: 85. 1805. Based on *Paspalum appressum* Lam.

Panicum beckmanniaeforme Mikan; Trin., in Spreng., Neu. Entd. 2: 83. 1821. Brazil.

Panicum brizaeforme Presl, Rel. Haenk. 1: 302. 1830. Luzon.

Panicum glomeratum Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 3. 1866. Not *P. glomeratum* Moench., 1794. Western Texas.

Panicum appressum Lam.; Doell, in Mart., Fl. Bras. 2^2: 184. 1877. Not *P. appressum* Forsk., 1775. Based on *Paspalum appressum* Lam.

Paspalidium geminatum Stapf, in Prain, Fl. Trop. Afr. 9: 585. 1920. Based on *P. geminatum* Forsk.

This species has been referred to *Panicum paspalodes* Pers., not known from America.

(135) **Panicum ghiesbreghtii** Fourn., Mex. Pl. 2: 29. 1886. Mexico, *Ghiesbreght.*

Panicum hirtivaginum Hitchc., Contrib. U.S. Natl. Herb. 12: 223. 1909. Cuba, *Wright* 758.

(82) **Panicum glabrifolium** Nash, Bull. Torrey Bot. Club 24: 196. 1897. Tampa, Fla., *Nash* 2415a.

(141) **Panicum gouini** Fourn., Mex. Pl. 2: 28. 1886. Vera Cruz, Mexico, *Gouin* 4.

Panicum gouini var. *pumilum* Fourn., Mex. Pl. 2: 28. 1886. Mexico, Vera Cruz, *Virlet* 1300; Antigua, *Liebmann* 450.

Panicum repens var. *confertum* Vasey, Bull. Torrey Bot. Club 13: 25. 1886. "Louisiana" [erroneous, type from Bay St. Louis, Miss., *Langlois*].

Panicum halophilum Nash, in Lloyd and Tracy, Bull. Torrey Bot. Club 28: 86. 1901. Based on *P. repens* var. *confertum* Vasey.

(160) **Panicum gymnocarpon** Ell., Bot. S.C. and Ga. 1: 117. 1816. Savannah, Ga., *Baldwin.*

Panicum monachnoides Desv., Opusc. 86. 1831. "Brazil" [locality erroneous].

Panicum drummondii Nees; Steud., Syn. Pl. Glum. 1: 63. 1854. New Orleans, La., *Drummond* [574].

Phanopyrum gymnocarpon Nash, in Small, Fl. Southeast. U.S. 104. 1903. Based on *Panicum gymnocarpon* Ell.

(133) **Panicum hallii** Vasey, Bull. Torrey Bot. Club 11: 61. 1884. Austin, Tex., *Hall* 816 (in part).

Panicum virletii Fourn., Mex. Pl. 2: 29. 1886. San Luis Potosí, Mexico, *Virlet* 1305, 1371.

(143) **Panicum havardii** Vasey, Bull. Torrey Bot. Club 14: 95. 1887. Described from type of *P. virgatum* var. *macranthum* Vasey.

Panicum virgatum var. *macranthum* Vasey, Bull. Torrey Bot. Club 13: 26. 1886. Not *P. macranthum* Trin., 1826. Guadalupe Mountains, Tex., *Havard.*

(91) **Panicum helleri** Nash, Bull. Torrey Bot. Club 26: 572. 1899. Kerrville, Tex., *Heller* 1759.

Panicum pernervosum Nash, Bull. Torrey Bot. Club 26: 576. 1899. Houston, Tex., *Hall* 830.

Panicum oligosanthes var. *helleri* Fernald, Rhodora 36: 80. 1934. Based on *P. helleri* Nash.

(159) **Panicum hemitomon** Schult., Mant. 2: 227. 1824. Based on *P. walteri* Muhl.

Panicum dimidiatum Walt., Fl. Carol. 72. 1788. Not *P. dimidiatum* L., 1753. South Carolina. Referred by Elliott to *P. walteri.*

Panicum walteri Ell., Bot. S.C. and Ga. 1: 115. 1816. Not *P. walteri* Pursh, 1814. Charleston, S.C.; Savannah, Ga., [type].

Panicum walteri Muhl., Descr. Gram. 108. 1817. Not *P. walteri* Pursh, 1814. No locality cited, probably Georgia.

Panicum carolinianum Spreng., Syst. Veg. 1: 310. 1825. Based on *P. walteri* Ell.

Oplismenus walteri Kunth, Rév. Gram. 1: 45. 1829. Based on *Panicum walteri* Muhl.

Panicum carinatum Torr., in Curtis, Bost. Jour. Nat. Hist. 1: 137. 1835. Not *P. carinatum* Presl, 1830. [Wilmington], N.C., [*M. A. Curtis*].

Panicum digitarioides Carpenter; Curtis, Amer. Jour. Sci. (II) 7: 410. 1849, not *P. digitarioides* Raspail, 1833, as synonym of *P. carinatum* Torr. Steud., Syn. Pl. Glum. 1: 75. 1854. North America [type, Louisiana, *Carpenter*].

Panicum curtisii Chapm., Fl. South. U.S. 573. 1860. Not *P. curtisii* Steud., 1854. Based on *P. walteri* Ell.

Oplismenus colonum var. *walteri* Fourn., Mex. Pl. 2: 40. 1886. Based on *O. walteri* Kunth.

Brachiaria digitarioides Nash, in Britton, Man. 77. 1901. Based on *P. digitarioides* Carpenter.

(154) **Panicum hians** Ell., Bot. S.C. and Ga. 1: 118. 1816. Charleston, S.C.

Panicum oblongiflorum Desv., Opusc. 89. 1831. Carolina, *Bosc.*

Panicum jejunum Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 103. 1836. Louisiana.

Aira incompleta Bosc.; Steud., Nom. Bot. ed. 2. 1: 45. 1840. Name only. [Carolina, *Bosc.*]

Steinchisma hians Nash, in Small, Fl. Southeast. U.S. 105. 1903. Based on *Panicum hians* Ell. This name, credited to Raf., is listed in Index Kewensis (4: 982. 1895.) as synonym of *Panicum debile* [Poir.] which is *Festuca obtusa*.

(126) **Panicum hillmani** Chase, Jour. Wash. Acad. Sci. 14: 345. f. 1. 1924. Amarillo, Tex., *Hitchcock* 16206.

(136) **Panicum hirsutum** Swartz, Fl. Ind. Occ. 1: 173. 1797. Jamaica, Hispaniola, *Swartz.*

Panicum elatum Willd.; Steud., Nom. Bot. ed. 2. 2: 256. 1841. Name only. South America, *Humboldt.*

(127) **Panicum hirticaule** Presl, Rel. Haenk. 1: 308. 1830. Acapulco, Mexico, *Haenke.*

Panicum flabellatum Fourn., Bull. Soc. Bot. France II. 27: 293. 1880. Omotepe Island, Nicaragua, *Lévy* 1166.

Panicum polygamum var. *hirticaule* Fourn., Mex. Pl. 2: 28. 1886. Based on *P. hirticaule* Presl, but misapplied to *P. maximum* Jacq.

Panicum capillare var. *glabrum* Vasey; T. S. Brandeg. Proc. Calif. Acad. II. 2: 211. 1889. Name only. Baja California, *Brandegee* in 1889.

(46) **Panicum huachucae** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 51. 1898. Huachuca Mountains, Ariz., *Lemmon* in 1882.

Panicum nitidum var. *pilosum* Torr., Fl. North. and Mid. U.S. 146. 1824. Not *P. pilosum* Swartz. New York.

Panicum languinosum var. *huachucae* Hitchc., Rhodora 8: 208. 1906. Based on *P. huachucae* Ashe.

Panicum lindheimeri var. *fasciculatum* subvar. *pilosum* Farwell, Amer. Midl. Nat. 11: 45. 1928. New York.

PANICUM HUACHUCAE var. FASCICULATUM (Torr.) F. T. Hubb., Rhodora 14: 171. 1912. Based on *P. dichotomum* var. *fasciculatum* Torr.

Panicum dichotomum var. *fasciculatum* Torr., Fl. North. and Mid. U.S. 145. 1824. New Jersey.

Panicum nitidum var. *ciliatum* Torr., Fl. North. and Mid. U.S. 146. 1824. New Jersey.

Panicum huachucae var. *silvicola* Hitchc. and Chase, in Robinson, Rhodora 10: 64. 1908. District of Columbia, *Chase* 2400.

Panicum lindheimeri var. *fasciculatum* Fernald, Rhodora 23: 228. 1921. Based on *P. dichotomum* var. *fasciculatum* Torr.

Panicum lanuginosum var. *fasciculatum* Fernald, Rhodora 36: 77. 1934. Based on *P. dichotomum* var. *fasciculatum* Torr.

(45) **Panicum implicatum** Scribn., U.S.Dept.Agr., Div. Agrost Bull. 11: 43. f. 2. 1898. Cape Elizabeth, Maine, *Scribner* in 1895.

Panicum unciphyllum implicatum Scribn. and Merr., Rhodora 3: 123. 1901. Based on *P. implicatum* Scribn.

Panicum lindheimeri var. *implicatum* Fernald, Rhodora 23: 228. 1921. Based on *P. implicatum* Scribn.

Panicum lanuginosum var. *implicatum* Fernald, Rhodora 36: 77. 1934. Based on *P. implicatum* Scribn.

(106) **Panicum joorii** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 31. 1889. Louisiana, *Joor.*

Panicum leiophyllum Fourn., Mex. Pl. 2: 20. 1886. Not *P. leiophyllum* Nees, 1829. Córdoba, Mexico, *Bourgeau.*

Panicum manatense Nash, Bull. Torrey Bot. Club 24: 42. 1897. Manatee County, Fla., *Nash* 2428a.

(85) **Panicum lancearium** Trin., Gram. Pan. 223. 1826. North America, *Enslin.*

Panicum nashianum Scribn., U.S. Dept.Agr., Div. Agrost. Bull. 7: 79. f. 61. 1897. Eustis, Fla., *Nash* 466.

(56) **Panicum languidum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 232. f. 245. 1910. Based on *P. unciphyllum* forma *prostratum* Scribn. and Merr.

Panicum unciphyllum forma *prostratum* Scribn. and Merr., Rhodora 3: 124. 1901. Not *P. prostratum* Lam.,1791. South Berwick, Maine, *Fernald* in 1897.

(48) **Panicum lanuginosum** Ell., Bot. S.C. and Ga. 1: 123. 1816. Georgia, *Baldwin.*

Panicum dichotomum var. *lanuginosum* Wood, Class-book ed. 3. 786. 1861. Presumably based on *P. lanuginosum* Ell.

Panicum orangense Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 113. 1899. Orange County, N.C., *Ashe* in 1898.

Panicum ciliosum Nash, Bull. Torrey Bot. Club 26: 568. 1899. Biloxi, Miss., *Tracy* 4580.

(109) **Panicum latifolium** L., Sp. Pl. 58. 1753. America.

Milium latifolium Moench, Meth. Pl. 204. 1794. Based on *P. latifolium* L.

Panicum macrocarpon LeConte; Torr., in Eaton, Man. Bot. ed. 2: 341. 1818. New York.

Panicum schnecki Ashe, N.C. Agr. Expt. Sta. Bull. 175: 116. 1900. Southern Indiana and Illinois [*Schneck*].

(9) **Panicum laxiflorum** Lam., Encycl. 4: 748. 1798. North America.

Panicum dichotomum var. *laxiflorum* Beal, Grasses N.Amer. 2: 139. 1896. Based on *Panicum laxiflorum* Lam.

Panicum pyriforme Nash, Bull. Torrey Bot. Club 26: 579. 1899. Orange Bend, Fla., *Nash* 239.

Panicum aureum Muhl.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 4. 1900, as synonym of *P. laxiflorum* Lam.

(95) **Panicum leibergii** (Vasey) Scribn., in Britt. and Brown, Illustr. Fl. 3: 497. 1898. Based on *P. scoparium* var. *leibergii* Vasey.

Panicum scoparium var. *leibergii* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 32. 1889. Plymouth County, Iowa, *Leiberg.*

Panicum scribnerianum var. *leibergii* Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 6: 32. 1897. Presumably based on *P. scoparium* var. *leibergii* Vasey.

Milium leibergii Lunell, Amer. Midl. Nat. 4: 213. 1915. Based on *Panicum scoparium* var. *leibergii* Vasey.

(134) **Panicum lepidulum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 75. f. 64. 1910. Chihuahua, Mexico, *Pringle* 497.

(40) **Panicum leucothrix** Nash, Bull. Torrey Bot. Club 24: 41. 1897. Eustis, Fla., *Nash* 1338.

Panicum parvispiculum Nash, Bull. Torrey Bot. Club 24: 347. 1897. Darien Junction, Ga., *Small* in 1895.

(39) **Panicum lindheimeri** Nash, Bull. Torrey Bot. Club 24: 196. 1897. [New Braunfels], Tex., *Lindheimer* 565.

Panicum funstoni Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 4. 1901. Three Rivers, Calif., *Coville* and *Funston* 1286.

Panicum lindheimeri var. *typicum* Fernald, Rhodora 23: 227. 1921. Based on *P. lindheimeri* Nash.

Panicum lanuginosum var. *lindheimeri* Fernald, Rhodora 36: 77. 1934. Based on *P. lindheimeri* Nash.

(7) **Panicum linearifolium** Scribn., in Britt. and Brown, Illustr. Fl. 3: 500. f. 268a. 1898. New York and New Jersey to Missouri. [Type, Washington, D.C., *Vasey* in 1882.]

Panicum strictum var. *linearifolium* Farwell, Amer. Midl. Nat. 11: 44. 1928. Based on *P. linearifolium* Scribn.

(150) **Panicum longifolium** Torr., Fl. North. and Mid. U.S. 149. 1824. New Jersey, *Goldy.*

Panicum anceps var. *pubescens* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 37. 1889. Mobile, Ala., *Mohr.*

Panicum pseudanceps Nash, Bull. Torrey Bot. Club 25: 85. 1898. Florida, *Simpson* in 1889.

Panicum longifolium var. *pubescens* Fernald, Rhodora 36: 69. 1934. Based on *P. anceps* var. *pubescens* Vasey.

(41) **Panicum longiligulatum** Nash, Bull. Torrey Bot. Club 26: 574. 1899. Apalachicola, Fla., *Vasey* in 1892.

(36) **Panicum lucidum** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 47. 1898. Lake Mattamuskeet, N.C., *Ashe* in 1898.

Panicum taxodiorum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 91. 1900. Lake Charles, La., *Mackenzie* 460.

(62) **Panicum malacon** Nash, Bull. Torrey Bot. Club 24: 197. 1897. Eustis, Fla., *Nash* 628.

Panicum strictifolium Nash, Bull. Torrey Bot. Club 26: 579. 1899. Eustis, Fla., *Nash* 603.

(90) **Panicum malacophyllum** Nash, Bull. Torrey Bot. Club 24: 198. 1897. Sapulpa, Indian Territory [Okla.], *Bush* 1228.

Panicum scoparium var. *minus* Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 48. 1894. Tennessee, *Gattinger*.

(28) **Panicum mattamuskeetense** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 45. 1898. Lake Mattamuskeet, N.C., *Ashe* and *Pearson* in 1898.

?*Panicum barbatum* LeConte; Torr., in Eaton, Man. Bot. ed. 2. 342. 1814. Not *P. barbatum* Lam., 1791. New York.

?*Panicum nitidum* var. *barbatum* Torr. Fl. North. and Mid. U.S. 146. 1824. No locality cited.

Panicum flexuosum Muhl.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 3. 1900. Not *P. flexuosum* Retz., 1791. Name only for specimen in Muhlenberg Herb. (See "(174)" Hitchcock, Bartonia 14: 39. 1932.)

(137) **Panicum maximum** Jacq., Coll. Bot. 1: 76. 1786. Guadeloupe.

Panicum polygamum Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Not *P. polygamum* Forsk., 1775. [Jamaica, *Swartz*.]

Panicum laeve Lam., Tabl. Encyl. 1: 172. 1791. Dominican Republic.

Panicum jumentorum Pers., Syn. Pl. 1: 83. 1805. Based on *P. polygamum* Swartz.

Panicum scaberrimum Lag., Gen. and Sp. Nov. 2. 1816. Mexico, *Sessé*.

Panicum trichocondylum Steud., Syn. Pl. Glum. 1: 74. 1854. Guadeloupe, *Duchaissing*.

Panicum praticola Salzm.; Doell, in Mart., Fl. Bras. 2^2: 203. 1877, as synonym of *P. maximum*. Bahia, Brazil, *Salzmann* 683.

(43) **Panicum meridionale** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 59. 1898. Chapel Hill and Burke County, N.C., *Ashe*.

Panicum filiculme Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 59. 1898. Not *P. filiculme* Hack., 1895. Chapel Hill, N.C., *Ashe* in 1898; Stone Mountain, Ga., *Small* in 1895.

?*Panicum microphyllum* Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 61. 1898. Chapel Hill, N.C., *Ashe* in 1898.

Panicum unciphyllum meridionale Scribn. and Merr., Rhodora 3: 123. 1901. Based on *P. meridionale* Ashe.

Panicum lindheimeri var. *implicatum* subvar. *meridionale* Farwell, Amer. Midl. Nat. 11: 45. 1928. Based on *P. meridionale* Ashe.

(25) **Panicum microcarpon** Muhl.; Ell., Bot. S.C. and Ga. 1: 127. 1816. [Georgia, *Baldwin*.]

Panicum heterophyllum Muhl., Amer. Phil. Soc. Trans. 3: 160. 1793. Name only.

Panicum nitidum var. *ramulosum* Torr., Fl. North. and Mid. U.S. 146. 1824. Quaker Bridge, N.J.

(130) **Panicum miliaceum** L., Sp. Pl. 58. 1753. India.

Milium panicum Mill., Gard. Dict. Milium no. 1. 1768. Based on *Panicum miliaceum* L.

Milium esculentum Moench, Meth. Pl. 203. 1794. Based on *Panicum miliaceum* L.

Panicum milium Pers., Syn. Pl. 1: 83. 1805. Based on *P. miliaceum* L.

Leptoloma miliacea Smyth, Kans. Acad. Sci. Trans. 25: 86. 1913. Based on *Panicum miliaceum* L.

(105) **Panicum mutabile** Scribn. and Smith; Nash, in Small, Fl. Southeast. U.S. 103. 1903. Biloxi, Miss., *Tracy* 3074.

(21) **Panicum neuranthum** Griseb., Cat. Pl. Cub. 232. 1866. Eastern Cuba, *Wright* 3453.

(26) **Panicum nitidum** Lam., Tabl. Encycl. 1: 172. 1791. Carolina, *Fraser*.

Panicum nodiflorum Lam., Encycl. 4: 744. 1798. Carolina, *Fraser*; South Carolina, *Michaux*.

Panicum dichotomum var. *nitidum* Wood, Class-book ed. 3. 786. 1861. Presumably based on *P. nitidum* Lam.

Panicum dichotomum var. *nodiflorum* Griseb., Cat. Pl. Cub. 234. 1866. Based on *P. nodiflorum* Lam.

Panicum subbarbulatum Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 29: 9. 1901. Based on *P. barbulatum* Michx. as described by Elliott, not Michaux's species. Presumably South Carolina.

(98) **Panicum nodatum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 293. 1910. Sarita, Tex., *Hitchcock* 3865.

(24) **Panicum nudicaule** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 31. 1889. Santa Rosa County, Fla., *Curtiss* [3583*].

(158) **Panicum obtusum** H.B.K., Nov. Gen. and Sp. 1: 98. 1815. Near Guanajuato, Mexico, *Humboldt* and *Bonpland.*

Panicum polygonoides C. Muell., Bot. Ztg. 19: 323. 1861. Not *P. polygonoides* Lam., 1798. Texas, *Drummond* 371.

Panicum repente Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 3. 1866. Texas [*Buckley*].

Brachiaria obtusa Nash, in Britton, Man. 77. 1901. Based on *Panicum obtusum* H.B.K.

(53) **Panicum occidentale** Scribn., Mo. Bot. Gard. Rept. 10: 48. 1899. Nootka Sound, Vancouver Island, *Haenke.*

Panicum dichotomum var. *pubescens* Munro; Benth., Pl. Hartw. 341. 1857. Name only. Sacramento, Calif., *Hartweg* 2024 (344).

(93) **Panicum oligosanthes** Schult., Mant. 2: 256. 1824. Based on *P. pauciflorum* Ell.

Panicum pauciflorum Ell., Bot. S.C. and Ga. 1: 120. 1816. Not *P. pauciflorum* R. Br., 1810. Georgia.

Panicum scoparium var. *angustifolium* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 32. 1889. South Carolina, *Ravenel.*

Panicum scoparium var. *pauciflorum* Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 48. 1894. Based on *P. pauciflorum* Ell.

(69) **Panicum oricola** Hitchc. and Chase, Rhodora 8: 208. 1906. Lewes, Del., *Hitchcock* 47.

Panicum columbianum var. *oricola* Fernald, Rhodora 36: 79. 1934. Based on *P. oricola* Hitchc. and Chase.

(59) **Panicum ovale** Ell., Bot. S.C. and Ga. 1: 123. 1816. St. Marys, Ga., *Baldwin.*

Panicum ciliiferum Nash, Bull. Torrey Bot. Club 24: 195. 1897. Eustis, Fla., *Nash* 147.

Panicum erythrocarpon Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 90. 1900. New Hanover County, N.C., *Ashe* in 1899.

(20) **Panicum ovinum** Scribn. and Smith, U. S.Dept.Agr., Div. Agrost. Circ. 16: 3. 1899. Waller County, Tex., *Thurow.*

Panicum redivivum Trin.; Steud., Nom. Bot. ed. 2. 2: 262. 1841. Name only. [Jalapa], Mexico, *Schiede.*

(54) **Panicum pacificum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 229. f. 241. 1910. Castle Crags, Calif., *Hitchcock* 3070.

(112) **Panicum paludivagum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 32. f. 13. 1910. Eustis, Fla., *Nash* 746.

(128) **Panicum pampinosum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 66. f. 48. 1910. Wilmot, Ariz., *Thornber* 193.

(88) **Panicum patentifolium** Nash, Bull. Torrey Bot. Club 26: 574. 1899. Eustis, Fla., *Nash* 72.

(86) **Panicum patulum** (Scribn. and Merr.) Hitchc., Rhodora 8: 209. 1906. Based on *P. nashianum patulum* Scribn. and Merr.

Panicum nashianum patulum Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 9. 1900. "Braidentown" (Bradenton), Fla., *Combs* 1296.

Panicum lancearium var. *patulum* Fernald, Rhodora 36: 80. 1934. Based on *P. nashianum patulum* Scribn. and Merr.

(97) **Panicum pedicellatum** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 28. 1889. [Kimble County], Tex., *Reverchon.*

(6) **Panicum perlongum** Nash, Bull. Torrey Bot. Club 26: 575. 1899. Creek Nation, Okla., *Carleton* 98.

Panicum pammeli Ashe, N.C. Agr. Expt. Sta. Bull. 175: 116. 1900. Iowa [*Cratty* in 1881].

Panicum strictum var. *perlongum* Farwell, Amer. Midl. Nat. 11: 44. 1928. Based on *P. perlongum* Nash.

(123) **Panicum philadelphicum** Bernh.; Trin., Gram. Pan. 216. 1826; Nees, Agrost. Bras. 198. 1829. [Philadelphia, Pa., *Bernhardi.*]
Panicum capillare var. *sylvaticum* Torr., Fl. North. and Mid. U.S. 149. 1824. Not *P. sylvaticum* Lam., 1798. New York City.
Panicum torreyi Fourn., in Hemsl., Biol. Centr. Amer. Bot. 3: 497. 1885. Based on *P. capillare* var. *sylvaticum* Torr.
Panicum capillare var. *minimum* Engelm.; Gattinger, Tenn. Fl. 94. 1887. [Green Brier, Tenn., *Gattinger.*]
Panicum minus Nash, Bull. Torrey Bot. Club 22: 421. 1895. Based on "*Panicum capillare* var. *minus* Muhl."
Panicum capillare var. *minus* Muhl.; Nash, Bull. Torrey Bot. Club 22: 421. 1895, as synonym of *P. minus* Nash. Muhlenberg does not give this a varietal name, noting only "varietas minor occurrit ubique in cultis magis aridis."
Panicum minimum Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 4. 1900. Based on *P. capillare* var. *minimum* Engelm.

(138) **Panicum plenum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 80. f. 69. 1910. Mangas Springs, N.Mex., *Metcalfe* 739.

(71) **Panicum polyanthes** Schult., Mant. 2: 257. 1824. Based on *P. multiflorum* Ell.
Panicum multiflorum Ell., Bot. S.C. and Ga. 1: 122. 1816. Not *P. multiflorum* Poir., 1816. Presumably South Carolina.
Panicum microcarpon Muhl., Descr. Gram. 111. 1817. Not *P. microcarpon* Muhl.; Ell., 1816. Virginia, "Cherokee" [type], and Delaware.
Panicum firmandum Steud., Syn. Pl. Glum. 1: 418. 1854. North Carolina, *M. A. Curtis.*
Panicum microcarpon var. *isophyllum* Scribn., Tenn. Agr. Exp. Sta. Bull. 7: 51. f. 54. 1894. [Alleghany Springs, Tenn., *Gayle.*]

(12) **Panicum polycaulon** Nash, Bull. Torrey Bot. Club 24: 200. 1897. Tampa, Fla., *Nash* 2420a.
Panicum dichotomum var. *glabrescens* Griseb., Fl. Brit. W.Ind. 553. 1864. Jamaica, *Purdie.*

(84) **Panicum portoricense** Desv.; Hamilt., Prodr. Pl. Ind. Occ. 11. 1825. Puerto Rico.
Panicum pauciciliatum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 87. 1900. Wilmington, N.C., *Ashe* in 1899.

(51) **Panicum praecocius** Hitchc. and Chase, Rhodora 8: 206. 1906. Wady Petra, Ill., *V. H. Chase* 649.

(58) **Panicum pseudopubescens** Nash, Bull. Torrey Bot. Club. 26: 577. 1899. Auburn, Ala., *Earle* and *Baker* 1537.
Panicum villosissimum var. *pseudopubescens* Fernald, Rhodora 36: 79. 1934. Based on *P. pseudopubescens* Nash.

(113) **Panicum purpurascens** Raddi, Agrost. Bras. 47. 1823. Rio de Janeiro, Brazil, *Raddi.* (*P. purpurascens* Opiz, 1822, is a name only.)
Panicum barbinode Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 256. 1834. Bahia, Brazil.
Panicum guadaloupense Steud., Syn. Pl. Glum. 1: 61. 1854. Guadeloupe.
Panicum equinum Salzm.; Steud., Syn. Pl. Glum. 1: 67. 1854. Bahia, Brazil, *Salzmann.*
Panicum pictigluma Steud., Syn. Pl. Glum. 1: 73. 1854. Brazil.
This species has been referred to *P. numidianum* Lam. Together with that and *P. barbinode* Trin. it is included under *Brachiaria mutica* (Forsk.) Stapf, in Prain, Fl. Trop. Afr. 9: 526. 1919.

(2) **Panicum ramisetum** Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 27: 9. 1900. Based on *P. subspicatum* Vasey.
Panicum subspicatum Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 25. 1889. Not *P. subspicatum* Desv., 1831. Texas, *Nealley.*
Chaetochloa ramiseta Smyth, Kans. Acad. Sci. Trans. 25: 89. 1913. Based on *Panicum ramisetum* Scribn.

Panicum ramosum L., Mant. Pl. 1: 29. 1767. "In Indiis."

(94) **Panicum ravenelii** Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 24: 36. 1901. Based on *P. scoparium* as described by Elliott. [South Carolina and Georgia.]
Panicum scoparium var. *majus* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 32. 1889. South Carolina, *Ravenel.*
Panicum scoparium var. *genuinum* Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 48. 1894. Based on *P. scoparium* Lam., as described by Elliott.

(140) **Panicum repens** L., Sp. Pl. ed. 2. 87. 1762. Southern Europe.
Panicum littorale Mohr; Vasey, Bot. Gaz. 4: 106. 1879. Mobile, Ala., *Mohr.*

(114) **Panicum reptans** L., Syst. Nat. ed. 10. 2: 870. 1759. [Jamaica, *Browne.*]
Panicum grossarium L., Syst. Nat. ed. 10. 2: 871. 1759. [Jamaica, *Browne,* typonym of *P. reptans* L.]
Panicum prostratum Lam., Tabl. Encycl. 1: 171. 1791. West Indies [type from Dominican Republic].
Panicum caespitosum Swartz, Fl. Ind. Occ. 1: 146. 1797. Jamaica, *Swartz.*
Panicum insularum Steud., Syn. Pl. Glum. 1: 61. 1854. Lesser Antilles, [*Hohenacker*].
Brachiaria prostrata Griseb., Abhandl. Gesell. Wiss. Göttingen 7: 263. 1857. Based on *Panicum prostratum* Lam.
Panicum aurelianum Hale, in Wood, Class-book ed. 3. 787. 1861. New Orleans, La., *Hale.*
Panicum prostratum var. *pilosum* Eggers, Fl. St. Croix and Virgin Isl. 104. 1879. St. Croix.
Urochloa reptans Stapf, in Prain, Fl. Trop. Afr. 9: 601. 1920. Based on *Panicum reptans* L.

(3) **Panicum reverchoni** Vasey, U.S.Dept.Agr. Div. Bot. Bull. 8: 25. 1889. [Dallas], Tex., *Reverchon.*
Chaetochloa reverchoni Smyth, Kans. Acad. Sci. Trans. 25: 88. 1913. Based on *Panicum reverchoni* Vasey.

(153) **Panicum rhizomatum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 109. f. 104. 1910. Orangeburg, S.C., *Hitchcock* 450.
Panicum anceps var. *rhizomatum* Fernald, Rhodora 36: 73. 1934. Based on *P. rhizomatum* Hitchc. and Chase.

(34) **Panicum roanokense** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 44. 1898. Roanoke Island, N.C., *Ashe* in 1898.
Panicum curtivaginum Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 85. 1900. Petit Bois Island, Miss., *Tracy* [4584].

(101) **Panicum scabriusculum** Ell., Bot. S.C. and Ga. 1: 121. 1816. Savannah, Ga., *Baldwin.*
Panicum lanuginosum Bosc; Spreng., Syst. Veg. 1: 319. 1825. Not *P. lanuginosum* Ell., 1816. Georgia.
Panicum eriophorum Schult., Mant. 3 (Add. 1): 591. 1827. Based on *P. lanuginosum* Bosc.
Panicum nealleyi Vasey, Bull. Torrey Bot. Club 13: 25. 1886. Texas, *Nealley.*
Panicum dichotomum var. *elatum* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 31. 1889. No locality cited. [Mobile, Ala., *Mohr.*]
Panicum viscidum var. *scabriusculum* Beal, Grasses N.Amer. 2: 143. 1896. Based on "*P. scabriusculum* Chapm. non Ell." Chapman uses Elliott's name correctly.

(60) **Panicum scoparioides** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 53. 1898. Centreville, Del., *Commons* 283.
Panicum villosissimum var. *scoparioides* Fernald, Rhodora 36: 79. 1934. Based on *P. scoparioides* Ashe.

(99) **Panicum scoparium** Lam., Encycl. 4: 744. 1798. South Carolina, *Michaux.*
Panicum pubescens Lam., Encycl. 4: 748. 1798. South Carolina, *Michaux.*
Panicum viscidum Ell., Bot. S.C. and Ga. 1: 123. pl. 7. f. 3. 1816. Presumably South Carolina.
Panicum nitidum var. *velutinum* Doell, in Mart., Fl. Bras. 2^2: 247. 1877. Based on *P. viscidum* Ell.
Panicum laxiflorum var. *pubescens* Chapm., Fl. South. U.S. ed. 3. 586. 1897. Not *P. laxiflorum* var. *pubescens* Vasey, 1892. Based on *P. pubescens* Lam., but misapplied to *P. strigosum* Muhl.
Chasea pubescens Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum pubescens* Lam.

(92) **Panicum scribnerianum** Nash, Bull. Torrey Bot. Club 22: 421. 1895. Based on *P. scoparium* as described by Watson in Gray's Manual. [Type, Pennsylvania, *Carey* in 1836.]
Panicum macrocarpon Torr., Fl. North. and Mid. U.S. 143. 1823. Not *P. macrocarpon* LeConte, 1818. Deerfield, Mass., *Cooley.*
Panicum scoparium S. Wats.; Nash, Bull. Torrey Bot. Club 22: 421. 1895, as synonym of *P. scribnerianum* Nash.
Panicum oligosanthes var. *scribnerianum* Fernald, Rhodora 36: 80. 1934. Based on *P. scribnerianum* Nash.

(61) **Panicum shastense** Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 3. 1901. Castle Crags, Calif., *Greata* in 1899.

(70) **Panicum sphaerocarpon** Ell., Bot. S.C. and Ga. 1: 125. 1816. Georgia, *Baldwin.*

Panicum kalmii Swartz; Wikstr., Adnot. Bot. 6. 1829. Pennsylvania, ?*Kalm.*
Panicum heterophyllum Swartz; Wikstr., Adnot. Bot. 6. 1829. Not *P. heterophyllum* Spreng., 1822. As synonym of *P. kalmii* Swartz.
Panicum dichotomum var. *sphaerocarpon* Wood, Class-book ed. 3. 786. 1861. Presumably based on *P. sphaerocarpon* Ell.
Panicum nitidum var. *crassifolium* A. Gray; Doell, in Mart., Fl. Bras. 2^2: 247. 1877. New Jersey.
Panicum microcarpon var. *sphaerocarpon* Vasey, Grasses U.S. 12. 1883. Based on *P. sphaerocarpon* Ell.
Panicum vicarium Fourn., Mex. Pl. 2: 20. 1886. Córdoba, Mexico, *Schaffner* 285.

PANICUM SPHAEROCARPON var. INFLATUM (Scribn. and Smith) Hitchc., Contrib. U.S. Natl. Herb. 15: 253. f. 275. 1910. Based on *P. inflatum* Scribn. and Smith. (Published as *P. sphaerocarpon inflatum*.)
Panicum inflatum Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Circ. 16: 1899. Biloxi, Miss., *Tracy* 4622.
Panicum mississippiense Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 91. 1900. Mississippi River below New Orleans, La., *Ashe.*

(37) **Panicum sphagnicola** Nash, Bull. Torrey Bot. Club 22: 422. 1895. Lake City, Fla., *Nash* 2500.

(38) **Panicum spretum** Schult., Mant. 2: 248. 1824. Based on Muhlenberg's *Panicum* no. 37. New England.
Panicum nitidum var. *densiflorum* Rand and Redfield, Fl. Mt. Desert 174. 1894. Mount Desert, Maine, *Rand.*
Panicum catoni Nash, Bull. Torrey Bot. Club 25: 84. 1898. Seabrook, N.H., *Eaton.*
Panicum octonodum Smith, U.S.Dept.Agr., Div. Agrost. Bull. 17: 73. f. 369. 1899. Waller County, Tex., *Thurow* in 1898.
Panicum paucipilum Nash, Bull. Torrey Bot. Club 26: 573. 1899. Wildwood, N.J., *Bicknell* in 1897.
Panicum nitidum octonodum Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 24: 34. 1901. Based on *P. octonodum* Smith.

(149) **Panicum stipitatum** Nash, in Scribn., U.S.Dept.Agr., Div. Agrost. Bull 17. (ed. 2): 56. f. 352. 1901. Based on *P. elongatum* Pursh.
Panicum elongatum Pursh, Fl. Amer. Sept. 1: 69. 1814. Not *P. elongatum* Salisb., 1796. New Jersey to Virginia. [Type, Delaware.]
Panicum agrostoides var. *elongatum* Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 42. pl. 9. f. 34. 1894. Based on *P. elongatum* Pursh.

(129) **Panicum stramineum** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 67. f. 50. 1910. Guaymas, Sonora, *Palmer* 206 in 1887.

(13) **Panicum strigosum** Muhl., in Ell., Bot. S.C. and Ga. 1: 126. 1816. [South Carolina and Georgia.]
Panicum laxiflorum var. *pubescens* Vasey, Contrib. U.S. Natl. Herb. 3: 30. 1892. No locality cited. [Type, Duval County, Fla., *Curtiss* (no. H).]
Panicum longipedunculatum Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 53. pl. 16. f. 61. 1894. Tennessee, White Cliff Springs, [*Scribner*, type], Tullahoma.

(52) **Panicum subvillosum** Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 86. 1900. Carlton, Minn., *Ashe.*
Panicum unciphyllum forma *pilosum* Scribn. and Merr., Rhodora 3: 124. 1901. Orono, Maine, *Fernald* 501.

(146) **Panicum tenerum** Beyr., in Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 341. 1834. Georgia, *Beyrich* [62].
Panicum anceps var. *strictum* Chapm., Fl. South. U.S. 573. 1860. Florida, *Chapman.*
This species has been referred to *Panicum stenodes* Griseb., of tropical America.

(47) **Panicum tennesseense** Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 52. 1898. La Vergne County, Tenn., *Biltmore Herbarium* 7087.
Panicum lindheimeri var. *septentrionale* Fernald, Rhodora 23: 227. 1921. Woodstock, New Brunswick, *Fernald* and *Long* 12527.
Panicum lindheimeri var. *tennesseense* Farwell, Amer. Midl. Nat. 11: 45. 1928. Based on *Panicum tennesseense* Ashe.
Panicum lanuginosum var. *septentrionale* Fernald, Rhodora 36: 77. 1934. Based on *P. lindheimeri* var. *septentrionale* Fernald.

(73) **Panicum tenue** Muhl., Descr. Gram. 118. 1817. No locality cited.
Panicum deustum Brickell and Enslin; Muhl., Descr. Gram. 119. 1817. Not *P. deustum* Thunb., 1794. As synonym of *P. tenue.*

Panicum liton Schult., Mant. 2: 250. 1824. Based on *P. tenue* Muhl., that name changed because of *P. tenue* Roxb., name only, 1813, not described until 1820.

Panicum unciphyllum Trin., Gram. Pan. 242. 1826. North America.

Panicum macrum Kunth, Rév. Gram. 1: 40. 1829. Based on *P. tenue* Muhl.

Panicum parvulum Muhl.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 4. 1900. Not *P. parvulum* Trin., 1834. As synonym of *P. tenue* Muhl.

(118) **Panicum texanum** Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 3. 1866. Austin, Tex.

(55) **Panicum thermale** Boland., Calif. Acad. Sci. Proc. 2: 181. 1862. Sonoma County, Calif.

(50) **Panicum thurowii** Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Circ. 16: 5. 1899. Waller County, Tex., *Thurow* in 1898.

(75) **Panicum trifolium** Nash, Bull. Torrey Bot. Club 26: 580. 1899. Macon, Ga., *Small* in 1895.

(67) **Panicum tsugetorum** Nash, Bull. Torrey Bot. Club 25: 86. 1898. Bronx Park, N.Y., *Nash* 287.

Panicum lanuginosum siccanum Hitchc. and Chase, Rhodora 8: 207. 1906. Starved Rock, Ill., *Chase* 1602.

(124) **Panicum tuckermani** Fernald, Rhodora 21: 112. 1919. Lake Memphremagog, Vt., *Tuckerman.*

Panicum soboliferum Tuckerm.; Scribn. and Merr., Rhodora 3: 106. 1901, as synonym of *P. minimum.* Lake Memphremagog, Vt., *Tuckerman.*

(157) **Panicum urvilleanum** Kunth, Rév. Gram. 2: 403. pl. 115. 1831. [Concepcion], Chile, *Dumont-d'Urville.*

Panicum megastachyum Presl, Rel. Haenk. 1: 305. 1830. Not *P. megastachyum* Nees, 1826. Huánuco, Peru, *Haenke.*

Panicum preslii Kunth, Rév. Gram. 1: Sup. X. 1830. Based on *P. megastachyum* Presl.

Panicum urvilleanum longiglume Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17 (ed. 2): 49. 1901. San Jacinto, Calif., *Parish Brothers* 887.

(79) **Panicum vernale** Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 266. f. 293. 1910. Lake City, Fla., *Hitchcock* 1020.

(155) **Panicum verrucosum** Muhl., Descr. Gram. 113. 1817. New Jersey, Delaware, and Georgia.

Panicum debile Ell., Bot. S.C. and Ga. 1: 129. 1816. Not *P. debile* Desf., 1798. Presumably South Carolina.

Panicum umbraculum Bosc; Spreng., Syst. Veg. 1: 314. 1825, as synonym of *P. verrucosum.* [*Bosc.*]

Panicum rugosum Bosc; Spreng., Syst. Veg. 1: 314. 1825, as synonym of *P. verrucosum.* [*Bosc.*]

(57) **Panicum villosissimum** Nash, Bull. Torrey Bot. Club 23: 149. 1896. Macon, Ga., *Small* in 1895.

Panicum tectum Willd.; Spreng., Syst. Veg. 1: 313. 1825. Name only. North America.

Panicum dichotomum var. *villosum* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 31. 1889. [Type, District of Columbia, *Vasey.*]

Panicum nitidum var. *pubescens* Scribn., in Kearney, Bull. Torrey Bot. Club 20: 479. 1893. Name only. Harlan and Bell Counties, Ky., *Kearney* 58 and 141 in part.

Panicum atlanticum Nash, Bull. Torrey Bot. Club 24: 346. 1897. Bronx Park, N.Y., *Nash.*

Panicum haemacarpon Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 55. 1898. District of Columbia, *Kearney* in 1897 [type]; North Carolina, *Ashe* in 1898; Iowa, *Carver* 258.

Panicum xanthospermum Scribn. and Mohr, Contrib. U.S. Nat. Herb. 6: 348. 1901. Greenville, Ala., *Mohr.*

(142) **Panicum virgatum** L., Sp. Pl. 59. 1753. Virginia [*Clayton* 578].

Panicum coloratum Walt., Fl. Carol. 73. 1788. Not *P. coloratum* L., 1767. South Carolina.

Eatonia purpurascens Raf., Jour. Phys. Chym. 89: 104. 1819. New York [type, Long Island].

Panicum pruinosum Bernh.; Trin., Gram. Pan. 191. 1826, as synonym of *P. virgatum.* North America [Delaware], *Bernhardi.*

Panicum giganteum Scheele, Linnaea 22: 340. 1849. Between San Antonio and New Braunfels, Tex., *Lindheimer.*

Panicum glaberrimum Steud., Syn. Pl. Glum. 1: 94. 1854. Grown at Berlin, seed from North America.
Ichnanthus glaber Link; Steud., Syn. Pl. Glum. 1: 94. 1854, as synonym of *P. glaberrimum* Steud.
Panicum kunthii Fourn.; Hemsl., Biol. Centr. Amer. Bot. 3: 490. 1885. Not *P. kunthii* Steud., 1841. Based on *P. coloratum* L. misapplied by Kunth.
Panicum virgatum var. *confertum* Vasey, Bull. Torrey Bot. Club 13: 26. 1886. No locality cited. [Type, Atlantic City, N.J., *Vasey*.]
Panicum virgatum var. *elongatum* Vasey, Bull. Torrey Bot. Club 13: 26. 1886. No locality cited. [Type, White River, S.Dak., *Wilcox* 13.]
Panicum virgatum var. *diffusum* Vasey, Bull. Torrey Bot. Club 13: 26. 1886. "Kansas, Colorado, etc."
Panicum virgatum var. *glaucephylla* Cassidy, Colo. Agr. Expt. Sta. Bull. 12: 29. 1890. Colorado.
Chasea virgata Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Based on *Panicum virgatum* L.
Milium virgatum Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Panicum virgatum* L.
Milium virgatum var. *elongatum* Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Panicum virgatum* var. *elongatum* Vasey.
PANICUM VIRGATUM var. CUBENSE Griseb., Cat. Pl. Cub. 233. 1866. [Hanábana], Cuba, *Wright* in 1865.
Panicum virgatum var. *obtusum* Wood, Amer. Bot. and Flor. pt. 2: 392. 1870. New Jersey.
Panicum virgatum var. *breviramosum* Nash, Bull. Torrey Bot. Club 23: 150. 1896. Augusta, Ga., *Small* in 1895.
Panicum virgatum var. *thyrsiforme* Linder, Rhodora 24: 14. 1922. Indian River, Fla., *Fredholm* 5580.
PANICUM VIRGATUM var. SPISSUM Linder, Rhodora 24: 15. 1922. Great Pubnico Lake, Nova Scotia, *Fernald, Long*, and *Linder* 19766.
(87) **Panicum webberianum** Nash, Bull. Torrey Bot. Club 23: 149. 1896. Eustis, Fla., *Nash* 781.
Panicum onslowense Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 88. 1900. Ward's Mill, Onslow County, N.C., *Ashe*.
(8) **Panicum werneri** Scribn., in Britt. and Brown, Illustr. Fl. 3: 501. f. 268b. 1898. New York and Ohio [type, Painesville, *Werner* 60].
Panicum delawarense Ashe, N.C. Agr. Expt. Sta. Bull. 175: 116. 1900. Centerville, Del., *Commons* [48] in 1878.
Panicum linearifolium var. *werneri* Fernald, Rhodora 23: 194. 1921. Based on *P. werneri* Scribn.
Panicum strictum var. *lincarifolium* subvar. *werneri* Farwell, Amer. Midl. Nat. 11: 44. 1928. Based on *P. werneri* Scribn.
(89) **Panicum wilcoxianum** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 8: 32. 1889. Nebraska [Fort Niobrara], *Wilcox* in 1888.
Milium wilcoxianum Lunell, Amer. Midl. Nat. 4: 213. 1915. Based on *Panicum wilcoxianum* Vasey.
(66) **Panicum wilmingtonense** Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 86. 1900. Wilmington, N.C., *Ashe* in 1899.
Panicum alabamense Ashe, N.C. Agr. Expt. Sta. Bull. 175: 116. 1900. Not *P. alabamense* Trin., 1854. Auburn, Ala., *Alabama Biological Survey* 1530.
(42) **Panicum wrightianum** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 44. f. 4. 1898. Vueltabajo, Cuba, *Wright* 3463.
Panicum strictum Bosc; Roem. and Schult., Syst. Veg. 2: 447. 1817. Not *P. strictum* R.Br., 1810. North America [type, Carolina, *Bosc*].
Panicum minutulum Desv., Opusc. 87. 1833. Not *P. minutulum* Gaud., 1826. Carolina.
Panicum deminutivum Peck, N.Y. State Mus. Bull. 10: 27. 1907. Suffolk County, N.Y., *Peck* in 1906.
(10) **Panicum xalapense** H.B.K., Nov. Gen. and Sp. 1: 103. 1815. Xalapa [Jalapa], Mexico, *Humboldt* and *Bonpland*.
Panicum pumilum Bosc; Nees, Agrost. Bras. 228. 1829. Not *P. pumilum* Lam., 1798. Name only. North America [*Bosc*].
Panicum rariflorum Rupr., Bull. Acad. Sci. Belg. 9²: 240. 1842. Not *P. rariflorum* Lam., 1798. Name only. Jalapa, Mexico, *Galeotti* 5733.
Panicum ruprechtii Fourn., Mex. Pl. 2: 21. 1886. Not *P. ruprechtii* Fenzl., 1854. Described from type of *P. rariflorum* Rupr.
Panicum caricifolium Scribn.; Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 57. 1898. Name only. Washington, D.C., *Kearney* in 1897.

This is the species described as *Panicum acuminatum* Swartz by Muhlenberg (Descr. Gram. 125. 1817).

PANICUM XALAPENSE var. STRICTIRAMEUM Hitchc. and Chase, Contrib. U.S. Natl. Herb. 15: 161. f. 148. 1910. Jackson, Miss., *Hitchcock* 1311. (Published as *P. xalapense strictirameum.*)

Panicum laxiflorum var. *strictirameum* Fernald, Rhodora 36: 75. 1934. Based on *P. xalapense strictirameum* Hitchc. and Chase.

(96) **Panicum xanthophysum** A. Gray, Gram. and Cyp. 1: no. 28. 1834. Oneida Lake, N.Y.

Panicum xanthophysum forma *amplifolium* Scribn., in Brainerd, Jones, and Eggleston, Fl. Vt. 104. 1900. Burlington, Vt., *Jones.*

(33) **Panicum yadkinense** Ashe, Jour. Elisha Mitchell Sci. Soc. 16: 85. 1900. Based on *Panicum maculatum* Ashe.

?*Panicum dumus* Desv., Opusc. 88. 1831. Tropical America (locality erroneous).

Panicum maculatum Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 44. 1898. Not *P. maculatum* Aubl., 1775. Raleigh, N.C., *Ashe* in 1895.

(37) PAPPOPHORUM Schreb.

(3) **Pappophorum bicolor** Fourn., Mex. Pl. 2: 133. 1886. Toluca, Mexico, *Karwinsky* 1483.

(2) **Pappophorum mucronulatum** Nees, Agrost. Bras. 412. 1829. Bahia and Piauhy, Brazil, *Martius.*

Pappophorum vaginatum Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 1. 1866. Western Texas [type, *Wright* 803].

Pappophorum apertum Munro; Scribn., Bull. Torrey Bot. Club 9: 148. 1882. Camp Lowell, Ariz., *Pringle.*

Pappophorum apertum var. *vaginatum* Scribn.; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 535. 1894. Based on *P. vaginatum* Buckl.

(1) **Pappophorum wrightii** S. Wats. Amer. Acad. Sci. Proc. 18: 178. 1883. [Devils River, Tex.], *Wright* 751 and 2029.

Pappophorum mexicanum Griseb.; Fourn., Mex. Pl. 2: 133. 1886. Mexico, Guadalupe, *Bourgeau;* valley of Mexico, *Schaffner* 184.

(128) PASPALUM L.[26]

(2) **Paspalum acuminatum** Raddi, Agrost. Bras. 25. 1823. Rio de Janeiro, Brazil, *Raddi.*

(11) **Paspalum almum** Chase, Jour. Wash. Acad. Sci. 23: 137. f. 1. 1933. Beaumont, Tex., *J. F. Combs* in 1932.

(42) **Paspalum bifidum** (Bertol.) Nash, Bull. Torrey Bot. Club 24: 192. 1897. Based on *Panicum bifidum* Bertol.

Panicum floridanum Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 248. 1834. Not *Paspalum floridanum* Michx. Florida and Alabama.

Panicum bifidum Bertol., Mem. Accad. Sci. Bologna 2: 598. pl. 41. f. 2. e–h. 1850. Alabama.

Panicum alabamense Trin.; Steud., Syn. Pl. Glum. 1: 64. 1854. Alabama, locality erroneously cited as North Carolina.

Paspalum racemulosum Nutt.; Chapm., Fl. South. U.S. 571. 1860. Florida to North Carolina and westward.

Paspalum interruptum Wood, Class-book 783. 1861. Louisiana and Texas, *Hale.*

(25) **Paspalum blodgettii** Chapm., Fl. South. U.S. 571. 1860. Key West, Fla., *Blodgett.*

Paspalum dissectum Swartz; Roem. and Schult., Syst. Veg. 2: 308. 1817. Not *P. dissectum* L. 1762. Erroneously given as synonym of *P. caespitosum* Flügge. Jamaica, *Swartz.*

Paspalum simpsoni Nash, Bull. Torrey Bot. Club 24: 39. 1897. No-Name Key, Fla., *Simpson* 184.

Paspalum gracillimum Nash, in Small, Fl. Southeast. U.S. 73, 1326. 1903. Key West, Fla., *Blodgett.*

Paspalum yucatanum Chase, Contrib. U.S. Natl. Herb. 28: 121. 1929. Mérida, Yucatan, *Schott* 597.

(41) **Paspalum boscianum** Flügge, Monogr. Pasp. 170. 1810. Carolina, *Bosc.*

Paspalum virgatum Walt., Fl. Carol. 75. 1788. Not *P. virgatum* L., 1759. South Carolina.

[26] For discussion of types see Chase, Contrib. U.S. Natl. Herb. 28: 7–239. 1929.

Paspalum brunneum Bosc; Flügge, Monogr. Pasp. 171. 1810, as synonym of *P. boscianum*. Carolina, *Bosc.*

Paspalum purpurascens Ell., Bot. S.C. and Ga. 1: 108. pl. 6. f. 3. 1816. South Carolina.

Paspalum confertum LeConte, Jour. Phys. Chym. 91: 285. 1820. Georgia, [*LeConte*].

Paspalum virgatum var. *purpurascens* Wood, Class-book 781. 1861. Based on *P. purpurascens* Ell.

(26) **Paspalum caespitosum** Flügge, Monogr. Pasp. 161. 1810. Hispaniola, *Poiteau* and *Turpin.*

Paspalum gracile Poir., in Lam., Encycl. Sup. 4: 313. 1816. Not *P. gracile* Rudge, 1805. Dominican Republic.

Paspalum heterophyllum Desv.; Poir., in Lam., Encycl. Sup. 4: 315. 1816. Dominican Republic.

Paspalum poirctii Roem. and Schult., Syst. Veg. 2: 878. 1817. Based on *P. gracile* Poir.

Paspalum lineare Fourn., Mex. Pl. 2: 12. 1886. Not *P. lineare* Trin., 1826. Mexico, *Liebmann* 187 [type; the other specimen cited, *Liebmann* 192, is *P. langei*].

Paspalum caespitosum var. *longifolium* Vasey, Bull. Torrey Bot. Club 13: 164. 1886. No locality cited. [Type, *Garber* in 1877.]

(19) **Paspalum ciliatifolium** Michx., Fl. Bor. Amer. 1: 44. 1803. Carolina, *Michaux.*

Paspalum debile Muhl., Cat. Pl. 8. 1813; Descr. Gram. 91. 1817. Not *P. debile* Michx., 1803. Georgia.

Paspalum spathaceum Desv.; Poir., in Lam., Encycl. Sup. 4: 314. 1816. America.

Paspalum latifolium LeConte, Jour. Phys. Chym. 91: 284. 1820. Columbia, S.C.

Paspalum ciliatifolium var. *brevifolium* Vasey, Acad. Nat. Sci. Phila. Proc. 1886: 285. 1886. Philadelphia, Pa., *Burk.*

Paspalum setaceum var. *ciliatifolium* Vasey, Contrib. U.S. Natl. Herb. 3: 17. 1892. Based on *P. ciliatifolium* Michx.

Paspalum chapmani Nash, Bull. N.Y. Bot. Gard. 1: 290. 1899. Florida, *Chapman.*

Paspalum eggertii Nash, Bull. N.Y. Bot. Gard. 1: 434. 1900. Arkansas, [type, Pine Bluff, *Eggert* in 1896].

Paspalum blepharophyllum Nash, in Small, Fl. Southeast. U.S. 71, 1326. 1903. Central Florida, *Nash* 1426.

Paspalum epile Nash, in Small, Fl. Southeast. U.S. 72, 1326. 1903. Key West, Fla., *Blodgett.*

(33) **Paspalum circulare** Nash, in Britton, Man. 73. 1901. New York to North Carolina; Missouri. [Type, Bergen County, N.J., *Nash* in 1889.]

Paspalum praelongum Nash, in Small, Fl. Southeast. U.S. 74, 1326. 1903. Washington, D.C., *Nash* in 1894.

Paspalum laeve var. *circulare* Stone, N.J. Mus. Ann. Rept. 1910: 187. 1911. Based on *P. circulare* Nash.

(28) **Paspalum conjugatum** Bergius, Act. Helv. Phys. Math. 7: 129. pl. 8. 1762. Dutch Guiana.

Paspalum tenue Gaertn., Fruct. and Sem. 2: 2. pl. 80. 1791. Apparently based on *P. conjugatum* Bergius.

Paspalum ciliatum Lam., Tabl. Encycl. 1: 175. 1791. Tropical America [French Guiana, *Leblond*].

Paspalum renggeri Steud., Syn. Pl. Glum. 1: 17. 1854. Paraguay, *Rengger.*

Paspalum longissimum Hochst.; Steud., Syn. Pl. Glum. 1: 19. 1854. Dutch Guiana, *Kappler* 1556.

Paspalum bicrurum Salzm.; Doell, in Mart., Fl. Bras. 2^2: 55. 1877, as synonym of *P. conjugatum.* Bahia, Brazil, *Salzmann.*

Paspalum conjugatum var. *parviflorum* Doell, in Mart., Fl. Bras. 2^2: 55. 1877. Brazil, Manáos, *Spruce* 894; Piauhy, *Gardner* 3502.

(14) **Paspalum debile** Michx., Fl. Bor. Amer. 1: 44. 1803. Carolina [type] and Georgia, *Michaux.*

?*Paspalum dissectum* Walt., Fl. Carol. 75. 1788. Not *P. dissectum* L. 1762. South Carolina.

Paspalum dubium DC., Cat. Hort. Monsp. 130. 1813. Native country unknown.

Paspalum infirmum Roem. and Schult., Syst. Veg. 2: 307. 1817. Based on *Paspalum debile* Michx.

Paspalum villosissimum Nash, Bull. Torrey Bot. Club 24: 40. 1897. Eustis, Fla. *Nash* 946.

(36) **Paspalum difforme** LeConte, Jour. Phys. Chym. 91: 284. 1820. Georgia.

(29) **Paspalum dilatatum** Poir., in Lam., Encycl. 5: 35. 1804. Argentina, *Commerson.*

Paspalum platense Spreng., Syst. Veg. 1: 247. 1825. Montevideo, Uruguay.

Paspalum ovatum Nees; Trin., Gram. Pan. 113. 1826. Brazil, *Besser.*

Paspalum lanatum Spreng., Syst. Veg. 4: Cur. Post. 30. 1827. Not *P. lanatum* H.B.K., 1816. Brazil.

Paspalum eriophorum Schult., Mant. 2: 560. 1827. Based on *P. lanatum* Spreng.

Paspalum ovatum var. *grandiflorum* Nees, Agrost. Bras. 43. 1829. Montevideo, Uruguay, *Sellow.*

Paspalum selloi Spreng.; Nees, Agrost. Bras. 43. 1829, as synonym of *P. ovatum* var. *grandiflorum* Nees.

Paspalum pedunculare Presl, Rel. Haenk. 1: 217. 1830. Habitat unknown.

Paspalum dilatatum var. *decumbens* Vasey, Bull. Torrey Bot. Club. 13: 166. 1886. No locality cited. [Type, Point-a-la-Hache, La., *Langlois* 27.]

Paspalum dilatatum var. *sacchariferum* Arech., An. Mus. Nac. Montevideo 1: 90. 1894. Uruguay.

Panicum platense Kuntze, Rev. Gen. Pl. 3^2: 363. 1898. Based on *Paspalum platense* Spreng.

Digitaria dilatata Coste, Fl. France 3: 553. 1906. Based on *Paspalum dilatatum* Poir.

(1) **Paspalum dissectum** (L.) L. Sp. Pl. ed. 2. 81. 1762. Based on *Panicum dissectum* L.

Panicum dissectum L., Sp. Pl. 57. 1753. Locality erroneously given as "Indiis", the type in the Linnaean Herbarium being from North America, collected by *Kalm.*

Paspalum dimidiatum L., Syst. Nat. ed. 10. 2: 855. 1759. Based on *Panicum dissectum* L.

Paspalum membranaceum Walt., Fl. Carol. 75. 1788. South Carolina.

Paspalum vaginatum Ell., Bot. S.C. and Ga. 1: 109. 1816. Not *P. vaginatum* Swartz, 1788. Savannah, Ga., *Baldwin.*

Paspalum walterianum Schult., Mant. 2: 166. 1824. Based on *P. membranaceum* Walt. In Chapman's Flora (570. 1860.) the name is givenas *P. walteri* Schult.

Paspalum tectum Steud., Syn. Pl. Glum. 1: 29. 1854. Florida, *Chapman.*

Paspalum drummondii C. Muell., Bot. Ztg. 19: 332. 1861. St. Louis, Mo., *Drummond* 182.

(5) **Paspalum distichum** L., Syst. Nat. ed. 10. 2: 855. 1759. [Jamaica, *Browne.*]

Digitaria paspalodes Michx., Fl. Bor. Amer. 1: 46. 1803. Charleston, S.C., *Michaux.*

Paspalum digitaria Poir., in Lam., Encycl. Sup. 4: 316. 1816. Charleston, S.C., *Bosc.*

Milium paspalodes Ell., Bot. S.C. and Ga. 1: 104. 1816. Based on *Digitaria paspalodes* Michx., but misapplied to *Axonopus furcatus* (Flügge) Hitchc.

Milium distichum Muhl., Descr. Gram. 78. 1817. Presumably based on *Paspalum distichum* L.

Paspalum michauxianum Kunth, Rév. Gram. 1: 25. 1829. Based on *Digitaria paspalodes* Michx.

Panicum paspaliforme Presl, Rel. Haenk. 1: 296. 1830. Peru, *Haenke.*

Panicum polyrrhizum Presl, Rel. Haenk. 1: 296. 1830. "Monterey, California" [but specimens probably collected in Baja California], *Haenke.*

Paspalum fernandezianum Colla, Mem. Accad. Sci. Torino 39: 27. pl. 59. 1836. Juan Fernandez, Chile, *Bertero.*

Paspalum chepica Steud., Syn. Pl. Glum. 1: 21. 1854. Juan Fernandez, Chile, *Bertero* 1223.

Paspalum vaginatum var. *pubescens* Doell, in Mart., Fl. Bras. 2^2: 75. 1877. Rio de Janeiro, Brazil, *Glaziou* 3612.

Paspalum schaffneri Griseb., in Fourn., Mex. Pl. 2: 6. 1886. Mexico, Chapultepec, *Schaffner* 19a; San Angel, *Schaffner* 19c; Mirador, *Schaffner* 19b.

Paspalum elliottii S. Wats., in A. Gray, Man. ed. 6. 629. 1890. Based on *Milium paspalodes* Ell. but misapplied to *Axonopus furcatus* (Flügge) Hitchc.

Paspalum paspaloides Scribn., Mem. Torrey Bot. Club 5: 29. 1894. Based on *Digitaria paspalodes* Michx. but misapplied to *Axonopus furcatus* (Flügge) Hitchc.

Digitaria disticha Fiori and Paol., Icon. Fl. Ital. Illustr. 1: 16. f. 136. 1895. Based on *Paspalum distichum* L.

Anastrophus paspaloides Nash, in Britton, Man. 75. 1901. Based on *Paspalum paspaloides* Scribn. but misapplied to *Axonopus furcatus* (Flügge) Hitchc.

Paspalum distichum var. *digitaria* Hack.; Stuck., An. Mus. Nac. Buenos Aires 13: 424. 1906. Based on *P. digitaria* Poir.

Paspalum distichum subsp. *paspalodes* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 77. 1912. Based on *Digitaria paspalodes* Michx.

(37) **Paspalum floridanum** Michx., Fl. Bor. Amer. 1: 44. 1803. Florida and Georgia, *Michaux.*

Paspalum macrospermum Flügge, Monogr. Pasp. 172. 1810. Carolina, *Bosc.*

Paspalum glabrum Bosc; Flügge, Monogr. Pasp. 172. 1810, as synonym of *P. macrospermum.*

Paspalum laevigatum Bosc; Poir., Encycl. Sup. 4: 313. 1816, as synonym of *P. floridanum* Michx.

Paspalum laeve var. *floridanum* Wood, Class-book ed. 3. 782. 1861. Presumably based on *P. floridanum* Michx.

Paspalum floridanum var. glabratum Engelm.; Vasey, Bull. Torrey Bot. Club 13: 166. 1886. No locality cited. [Type, Mobile, Ala., *Mohr* in 1884.]

?*Paspalum altissimum* LeConte, Jour. Phys. Chym. 91: 285. 1820. Salem, N.C.

?*Paspalum laeve* var. *altissimum* Wood, Class-book ed. 3. 782. 1861. Based on *P. altissimum* LeConte.

Paspalum glabratum Mohr, Bull. Torrey Bot. Club 24: 21. 1897. Based on *P. floridanum* var. *glabratum* Engelm.

(38) **Paspalum giganteum** Baldw.; Vasey, Bull. Torrey Bot. Club 13: 166. 1886. No locality cited. [Type, Pablo Creek, Fla., *Curtiss* in 1875.]

Paspalum longicilium Nash, Bull. N.Y. Bot. Gard. 1: 435. 1900. Eustis, Fla., *Nash* 1359.

(8) **Paspalum hartwegianum** Fourn., Mex. Pl. 2: 12. 1886. León, Mexico, *Hartweg* 245.

Paspalum buckleyanum Vasey, Bull. Torrey Bot. Club 13: 167. 1886. Texas, *Buckley.* In Jacks., Ind. Kew. Sup. 1: 312. 1906, the name is erroneously listed under *Panicum.*

(31) **Paspalum laeve** Michx., Fl. Bor. Amer. 1: 44. 1803. Georgia, *Michaux.*

Paspalum undulosum LeConte, Jour. Phys. Chym. 91: 284. 1820. Georgia, [*LeConte*].

Paspalum angustifolium LeConte, Jour. Phys. Chym. 91: 285. 1820. Carolina and Georgia, [*LeConte*].

Paspalum lecomteanum Schult., Mant. 2: 168. 1824. Based on *P. undulosum* LeConte.

Paspalum punctulatum Bertol., Mem. Accad. Sci. Bologna 2: 599. pl. 42. f. a–e. 1850. Alabama.

Paspalum alternans Steud., Syn. Pl. Glum. 1: 26. 1854. Louisiana, *Hartman* 40.

Paspalum tenue Darby, Bot. South. States 576. 1857. Not *P. tenue* Gaertn., 1791. Georgia and northward.

Paspalum laeve var. *undulosum* Wood, Class-book ed. 3. 782. 1861. Based on *P. undulosum* LeConte.

Paspalum angustifolium var. *tenue* Wood, Amer. Bot and Flor. pt. 2: 390. 1870. New Jersey and south.

Paspalum laeve var. *angustifolium* Vasey, Bull. Torrey Bot. Club 13: 165. 1886. Based on *P. angustifolium* LeConte.

Paspalum laeve var. *brevifolium* Vasey, Contrib. U.S. Natl. Herb. 3: 18. 1892. No locality cited. [Type, Texas, *Nealley* in 1886.]

Paspalum australe Nash, in Britton, Man. 1039. 1901. Stone Mt., Ga., *Small* in 1895.

Paspalum laeve australe Nash, in Hitchc., Rhodora 8: 205. 1906. Based on *P. australe* Nash.

(24) **Paspalum langei** Nash, N.Amer. Fl. 17: 179. 1912. Based on *Dimorphostachys langei* Fourn.

Panicum senescens Trin.; Steud., Nom. Bot. ed. 2. 2: 263. 1841, name only. [Mexico, *Schiede.*]

Paspalum abbreviatum Trin.; Fourn., Mex. Pl. 2: 10. 1886, name only. Mexico, *Schiede* 888.

Dimorphostachys langei Fourn., Mex. Pl. 2: 14. 1886. Mexico, *Liebmann* 186.

Dimorphostachys drummondii Fourn., Mex. Pl. 2: 15. 1886. Not *Paspalum drummondii* C. Muell., 1861. Texas, *Drummond* [350].

Panicum squamatum Fourn., Mex. Pl. 2: 18. 1886. Not *Paspalum squamatum* Steud., 1854. Mexico, *Karwinsky* 982.

Paspalum drummondii Vasey, Contrib. U.S. Natl. Herb. 3: 18. 1892. Not *P. drummondii* C. Muell., 1861. Based on *Dimorphostachys drummondii* Fourn.

Paspalum oricola Millsp. and Chase, Field Mus. Bot. 3: 28. f. 28. 29. 1903. Island of Cozumel, Yucatan, *Millspaugh Pl. Uto.* 1480.

Dimorphostachys ciliifera Nash, in Small, Fl. Southeast. U.S. 78, 1327. 1903. Manatee, Fla., *Simpson* 97.

Paspalum ciliiferum Hitchc., Contrib. U.S. Natl. Herb. 12: 201. 1909. Based on *Dimorphostachys ciliifera* Nash.

(27) **Paspalum laxum** Lam., Tabl. Encycl. 1: 176. 1791. Tropical America [probably St. Croix], *Richard.*

Paspalum glabrum Poir., in Lam., Encycl. 5: 30. 1804. Puerto Rico, *Ledru.*

Paspalum miliodeum Desv.; Poir., in Lam., Encycl. Sup. 4: 315. 1816. Puerto Rico.

Paspalum miliare Spreng., Syst. Veg. 1: 247. 1825. Based on *P. miliodeum* Desv.

Paspalum ischnocaulon Trin., Gram. Icon. 2: pl. 126. 1828. Source erroneously given as East Indies, doubtless error for West Indies.

Paspalum floribundum Desv., Opusc. 58. 1831. West Indies.

Paspalum rhizomatosum Steud., Syn. Pl. Glum. 1: 17. 1854. Guadeloupe, *Duchaissing.*

Paspalum koleopodum Steud., Syn. Pl. Glum. 1: 18. 1854. Guadeloupe, *Duchaissing.*

Paspalum laxum var. *lamarckianum* Doell, in Mart., Fl. Bras. 2^2: 86. 1877. Based on *P. laxum* Lam., but misapplied to a Brazilian species.

Paspalum helleri Nash, Bull. Torrey Bot. Club 30: 376. 1903. Santurce, Puerto Rico, *Heller* 10.

Paspalum tenacissimum Mez, Bot. Jahrb. Engler 56: Beibl. 125: 10. 1921. Puerto Rico, *Hioram* 804.

(35) **Paspalum lentiferum** Lam., Tabl. Encycl. 1: 175. 1791. Carolina, *Fraser.*

Paspalum lanuginosum Bosc; Beauv., Ess. Agrost. 12. 1812. Name only. [Carolina, *Bosc.*]

Paspalum lanuginosum Willd.; Steud., Nom. Bot. ed. 2. 2: 271. 1841, as synonym of *P. lentiferum* Lam.

Paspalum curtisianum Steud., Syn. Pl. Glum. 1: 26. 1854. Carolina, *M. A. Curtis.*

Paspalum praecox var. *curtisianum* Vasey, Bull. Torrey Bot. Club 13: 165. 1886. Based on *P. curtisianum* Steud.

Paspalum glaberrimum Nash, in Small, Fl. Southeast. U.S. 76, 1326. 1903. Central Florida, *Nash* 1619.

Paspalum tardum Nash, in Small, Fl. Southeast. U.S. 76, 1326. 1903. Florida, *Nash* 2047.

Paspalum kearneyi Nash, in Small, Fl. Southeast. U.S. 77, 1326. 1903. Nicholson, Miss., *Kearney* 357.

Paspalum amplum Nash, in Small, Fl. Southeast. U.S. 77, 1326. 1903. Marianna, Fla., *Tracy* 3682.

(7) **Paspalum lividum** Trin., in Schlecht., Linnaea 26: 383. 1854. Mexico, *Schiede.*

(12) **Paspalum longepedunculatum** LeConte, Jour. Phys. Chym. 91: 284. 1820. North Carolina, [*LeConte*].

Paspalum setaceum var. *longepedunculatum* Wood, Class-book 782. 1861. Based on *P. longepedunculatum* LeConte.

Paspalum kentuckiense Nash, in Britton, Man. 1039. 1901. Poor Fork, Ky., *Kearney* in 1893.

(32) **Paspalum longipilum** Nash, Bull. N.Y. Bot. Gard. 1: 435. 1900. Eustis, Fla., *Nash* 1027.

Paspalum laeve var. *pilosum* Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 34. 1894. Tennessee, [type, Madisonville, *Scribner*].

Paspalum plenipilum Nash, in Britton, Man. 73. 1901. New Jersey, [type, Clifton, *Nash* in 1892].

(10) **Paspalum minus** Fourn., Mex. Pl. 2: 6. 1886. Mexico, *Bourgeau* 2298 [type], *Liebmann* 154.

(23) **Paspalum monostachyum** Vasey; Chapm., Fl. South. U.S. ed. 2. 665. 1883. South Florida, *Garber* [224].

Paspalum rectum var. *longispicatum* Vasey, Bot. Gaz. 9: 54, 55. 1884. Miami, Fla., *Garber*.

Paspalum solitarium Nash, in Small, Fl. Southeast. U.S. 77, 1326. 1903. Based on *Paspalum monostachyum* "Vasey not Walp." Walper's is a name only.

(9) **Paspalum notatum** Flügge, Monogr. Pasp. 106. 1810. St. Thomas, West Indies.

Paspalum taphrophyllum Steud., Syn. Pl. Glum. 1: 19. 1854. Martinique, *Sieber* 365 [error for 364].

Paspalum distachyon Willd.; Doell, in Mart., Fl. Bras. 2^2: 73. 1877. Not *P. distachyon* Poit., 1834. As synonym of *P. notatum*.

Paspalum notatum var. *latiflorum* Doell, in Mart., Fl. Bras. 2^2: 73. 1877. Brasil and Uruguay, *Sellow*.

Paspalum saltense Arech., An. Mus. Nac. Montevideo 1: 53. 1894. Department del Salto, Uruguay.

Paspalum paucispicatum Vasey, Contrib. U.S. Natl. Herb. 1: 281. 1893. Guadalajara, Mexico, *Palmer* 243 in 1886.

(40) **Paspalum plicatulum** Michx., Fl. Bor. Amer. 1: 45. 1803. Georgia and Florida, *Michaux*.

Paspalum undulatum Poir., in Lam., Encycl. 5: 29. 1804. Puerto Rico, *Ledru*.

Paspalum plicatum Pers., Syn. Pl. 1: 86. 1805, error for *plicatulum*.

Paspalum lenticulare H.B.K., Nov. Gen. and Sp. 1: 92. 1815. Venezuela, *Humboldt* and *Bonpland*.

Paspalum gracile LeConte, Jour. Phys. Chym. 91: 285. 1820. Not *P. gracile* Rudge. Georgia, *LeConte*.

Paspalum leptos Schult., Mant. 2: 173. 1824. Based on *P. gracile* LeConte.

Paspalum montevidense Spreng., Syst. Veg. 1: 246. 1825. Montevideo, Uruguay, *Sellow*.

Paspalum tenue Kunth, Rév. Gram. 1: 26. 1829. Not *P. tenue* Gaertn., 1791. Based on *P. gracile* LeConte.

Paspalum multiflorum Desv., Opusc. 58. 1831. Brazil.

Paspalum orthos Schult.; Kunth, Enum. Pl. 1: 57. 1833. Apparently misprint for *P. leptos*.

Paspalum marginatum Spreng., in Steud., Nom. Bot. ed. 2. 2: 272. 1841. Not *P. marginatum* Trin., 1826. As synonym of *P. undulatum* Poir. [Puerto Rico.]

Paspalum campestre Schlecht., Linnaea 26: 131. 1853. Not *P. campestre* Trin., 1834. Venezuela, *Wagener* 392.

Paspalum atrocarpum Steud., Syn. Pl. Glum. 1: 25. 1854. Habitat unknown. *Dumont-d'Urville*.

Paspalum virgatum var. *undulatum* Wood, Amer. Bot. and Flor. pt. 2: 390. 1870. Eastern States.

Paspalum antillense Husnot, Bull. Soc. Linn. Normand. II. 5: 260. 1871. Guadeloupe, *Husnot* 76.

Paspalum saxatile Salzm.; Doell, in Mart., Fl. Bras. 2^2: 76. 1877, as synonym of *P. plicatulum* Michx. Brazil, *Salzmann*.

Paspalum decumbens Sagot; Doell, in Mart., Fl. Bras. 2^2: 77. 1877. Not *P. decumbens* Swartz, 1788. As synonym of *P. plicatulum*. French Guiana, *Sagot* 1342.

Paspalum plicatulum var. *intumescens* Doell, in Mart., Fl. Bras. 2^2: 78. 1877. Lagoa Santa, Brazil, *Warming*.

Paspalum pauperculum Fourn., Mex. Pl. 2: 10. 1886. San Luis Potosí, Mexico, *Virlet* 1320.

Paspalum pauperculum var. *altius* Fourn., Mex. Pl. 2: 10. 1886. Orizaba, Mexico, *Bourgeau* 2033 [probably misprint for 2633].

Panicum plicatulum Kuntze, Rev. Gen. Pl. 3^2: 363. 1898. Based on *Paspalum plicatulum* Michx.

(34) **Paspalum praecox** Walt., Fl. Carol. 75. 1788. South Carolina.

(20) **Paspalum propinquum** Nash, Bull. N.Y. Bot. Gard. 1: 291. 1899. Eustis, Fla., *Nash* 1427.

(16) **Paspalum psammophilum** Nash, in Hitchc., Rhodora 8: 205. 1906. Based on *P. prostratum* Nash.

Paspalum prostratum Nash, in Britton, Man. 74. 1901. Not *P. prostratum* Scribn. and Merr., 1901 (earlier than the preceding). New York to Delaware, [type, Kingsbridge, N.Y., *Nash* 514].

(18) **Paspalum pubescens** Muhl., in Willd., Enum. Pl. 89. 1809. Carolina.
Paspalum muhlenbergii Nash, in Britton, Man. 75. 1901. Massachusetts to Georgia, Missouri, Oklahoma, and Mississippi. [Type, Van Cortlandt Park, N.Y., *Bicknell* in 1896.]
Paspalum pubescens var. *muhlenbergii* House, N.Y. State Mus. Bull. 243–244: 39. 1923. Based on *Paspalum muhlenbergii* Nash.
Paspalum ciliatifolium var. *muhlenbergii* Fernald, Rhodora 36: 20. 1934. Based on *P. muhlenbergii* Nash.
(6) **Paspalum pubiflorum** Rupr.; Fourn., Mex. Pl. 2: 11. 1886. Mexico, *Galeotti* 5747.
Paspalum planifolium Fourn., Mex. Pl. 2: 10. 1886. Mexico, San Luis Potosí, *Virlet* [type; the other specimen cited, *Müller* 2062, is *P. lividum*].
Paspalum pubiflorum var. *viride* Fourn., Mex. Pl. 2: 11. 1886. San Luis Potosí, *Virlet* 1328.
Paspalum hallii Vasey and Scribn., Bull. Torrey Bot. Club 13: 165. 1886, as doubtful synonym of *P. remotum* Remy, a Bolivian species. Description drawn from *Hall* 804, Texas.
Paspalum remotum var. *glaucum* Scribn., in Vasey, Bull. Torrey Bot. Club 13: 165. 1886. No locality cited. [Type, Grapevine Canyon, Tex. *Havard* in 1883.]
Paspalum pubiflorum var. *glaucum* Scribn., Contrib. U.S. Natl. Herb. 3: 19. 1892. Southwestern Texas and Mexico [type same as preceding].
PASPALUM PUBIFLORUM var. GLABRUM Vasey; Scribn., Tenn. Agr. Expt. Sta. Bull. 7: 32. pl. 5. f. 18. 1894. Belle Meade, Tenn., *Scribner* in 1892.
Paspalum remotum var. *glabrum* Vasey, Bull. Torrey Bot. Club 13: 166. 1886. No locality cited. [Type, Plaquemines Parish, La., *Langlois* 26.]
Paspalum geminum Nash, Bull. N.Y. Bot. Gard. 1: 434. 1900. Eustis, Fla., *Nash* 680.
Paspalum laeviglume Scribn.; Nash, in Small, Fl. Southeast. U.S. 75, 1326. 1903. Based on *P. remotum* var. *glabrum* Vasey.
Paspalum racemosum Lam., Tabl. Encycl. 1: 176. 1791. Peru.
(3) **Paspalum repens** Bergius, Acta. Helv. Phys. Math. 7: 129. pl. 7. 1762. Dutch Guiana.
Paspalum gracile Rudge, Pl. Guian. 20. pl. 26. 1805. British Guiana.
Paspalum mucronatum Muhl., Cat. Pl. S. 1813, name only; Georgia; Descr. Gram. 96. 1817. Mississippi and Georgia.
Ceresia fluitans Ell., Bot. S.C. and Ga. 1: 109. pl. 6. f. 4. 1816. Ogechee, Ga.
Paspalum natans LeConte, Jour. Phys. Chym. 91: 285. 1820. Georgia.
Paspalum fluitans Kunth, Rév. Gram. 1: 24. 1829. Based on *Ceresia fluitans* Ell.
Paspalum frankii Steud., Syn. Pl. Glum. 1: 19. 1854. New Orleans, La., *Frank.*
Paspalum bistipulatum Hochst.; Steud., Syn. Pl. Glum. 1: 29. 1854. Dutch Guiana, *Hostmann* 707a.
Cymatochloa fluitans Schlecht., Bot. Ztg. 12: 822. 1854. Based on *Ceresia fluitans* Ell.
Cymatochloa repens Schlecht., Bot. Ztg. 12: 822. 1854. Based on *Paspalum repens* Bergius.
This is the species described under *Paspalum paniculatum* by Walter (Fl. Carol. 75. 1788).
(21) **Paspalum rigidifolium** Nash, Bull. N.Y. Bot. Gard. 1: 292. 1899. Eustis, Fla., *Nash* 629.
Paspalum scrobiculatum L., Mant. pl. 1: 29. 1767. India.
(13) **Paspalum setaceum** Michx., Fl. Bor. Amer. 1: 43. 1803. South Carolina, *Michaux.*
Paspalum hirsutum Retz., misapplied by Poir., in Lam., Encycl. 5: 28. 1804. Carolina, *Bosc.*
Paspalum leptostachyum DC., Cat. Hort. Monsp. 130. 1813. Not *P. leptostachyum* Humb. and Bonpl., 1810. No locality cited, type without locality.
Paspalum incertum Roem. and Schult., Syst. Veg. 2: 308. 1817. Based on *P. leptostachyum* DC.
Paspalum eriophorum Willd.; Nees., Agrost. Bras. 56. 1829. Not *P. eriophorum* Schult., 1827. Native country unknown.
(17) **Paspalum stramineum** Nash, in Britton, Man. 74. 1901. Nebraska [type, Hooker County, *Rydberg* 1582], Kansas, and Indian Territory [Oklahoma].
Paspalum bushii Nash, in Britton, Man. 74. 1901. Missouri [type, Bernie, *Bush* 730].

Paspalum ciliatifolium var. *stramineum* Fernald, Rhodora 36: 20. 1934. Based on *P. stramineum* Nash.

(15) **Paspalum supinum** Bosc; Poir., in Lam., Encycl. 5: 29. 1804. Carolina, *Bosc.*

Paspalum dasyphyllum Ell., Bot. S.C. and Ga. 1: 106. 1816. South Carolina.

Paspalum setaceum var. *supinum* Trin., Gram. Icon. 2: pl. 130. 1829. Based on *P. supinum* Bosc.

Paspalum ciliatifolium var. *dasyphyllum* Chapm., Fl. South. U.S. ed. 3. 578. 1897. Based on *P. dasyphyllum* Ell.

(22) **Paspalum unispicatum** (Scribn. and Merr.) Nash, N.Amer. Fl. 17: 193. 1912. Based on *Panicum unispicatum* Scribn. and Merr.

Panicum unispicatum Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 24: 14. 1901. Oaxaca, Mexico, *Pringle* 6717.

(30) **Paspalum urvillei** Steud., Syn. Pl. Glum. 1: 24. 1854. [Brazil], *Dumont-d'Urville.*

Paspalum ovatum var. *parviflorum* Nees, Agrost. Bras. 43. 1829. Brazil, *Martius.*

Paspalum velutinum Trin.; Nees, Agrost. Bras. 43. 1829, as synonym of *P. ovatum* var. *parviflorum* Nees.

Paspalum dilatatum var. *parviflorum* Doell, in Mart., Fl. Bras. 2^2: 64. 1877. Pernambuco, Forsell; Lagoa Santa, *Warming* [type].

Paspalum virgatum var. *parviflorum* Doell, in Mart., Fl. Bras. 2^2: 89. 1877. Brazil, *Raben.*

Paspalum virgatum var. *pubiflorum* Vasey, Bull. Torrey Bot. Club 13: 167. 1886. No locality cited. [Type, Atakopus, La., *Langlois* in 1884.]

Paspalum larranagai Arech., An. Mus. Nac. Montevideo 1: 60. pl. 2. 1894. Uruguay.

Paspalum vaseyanum Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 32. f. 32. 1899. Based on *P. virgatum* var. *pubiflorum* Vasey.

Paspalum griseum Hack.; Corrêa, Fl. Brazil 12: 8. 1909. Name only. Brazil [*Glaziou* 16559].

(4) **Paspalum vaginatum** Swartz, Prodr. Veg. Ind. Occ. 21. 1788. Jamaica, *Swartz.*

Digitaria foliosa Lag., Gen. and Sp. Nov. 4. 1816. Habana, Cuba.

Paspalum tristachyum LeConte, Jour. Phys. Chym. 91: 285. 1820. Georgia [*LeConte*].

Digitaria tristachya Schult., Mant. 2: 261. 1824. Based on *Paspalum tristachyum* LeConte.

Paspalum brachiatum Trin.; Nees, Agrost. Bras. 62. 1829, as synonym of *P. vaginatum.* Martinique, *Sieber.*

Paspalum foliosum Kunth, Rév. Gram. 1: 25. 1829. Based on *Digitaria foliosa* Lag.

Paspalum kleineanum Presl, Rel. Haenk. 1: 209. 1830. Peru, *Haenke.*

Paspalum inflatum A. Rich., in Sagra, Hist. Cuba 11: 298. 1850. Habana, Cuba, *Sagra.*

Paspalum didactylum Salzm.; Steud., Syn. Pl. Glum. 1: 20. 1854, as synonym of *P. vaginatum.* Brazil, *Salzmann.*

Panicum vaginatum Gren. and Godr., Fl. France 3: 462. 1855. Not *P. vaginatum* Nees, 1829. Based on *Paspalum vaginatum* Swartz.

Paspalum distichum var. *tristachum* Wood, Class-book 783. 1861. Presumably based on *P. tristachyum* LeConte.

Paspalum distichum var. *vaginatum* Swartz; Griseb., Fl. Brit. W.Ind. 541. 1864. Based on *P. vaginatum* Swartz.

Paspalum reptans Poir.; Doell, in Mart., Fl. Bras. 2^2: 75. 1877, as synonym of *P. vaginatum.*

Paspalum vaginatum var. *nanum* Doell, in Mart., Fl. Bras. 2^2: 75. 1877. Rio de Janeiro, Brazil, *Glaziou* 4346.

Paspalum reimarioides Chapm., Fl. South. U.S. 665. 1883. Not *P. reimaricides* Brongn., 1830. West Florida [*Chapman*].

Paspalum vaginatum var. *reimarioides* Chapm., Fl. South. U.S. ed. 3. 577. 1897. Presumably based on *P. reimarioides* Chapm.

Paspalum distichum var. *nanum* Stapf, in Dyer, Fl. Cap. 7: 371. 1898. Based on *P. vaginatum* var. *nanum* Doell.

Sanguinaria vaginata Bubani, Fl. Pyr. 4: 258. 1901. Based on *Paspalum vaginatum* Swartz.

(39) **Paspalum virgatum** L., Syst. Nat. ed. 10. 2: 855. 1759. Jamaica.

Paspalum virgatum var. *linneanum* Flügge, Monogr. Pasp. 190. 1810. Based on *P. virgatum* L.

Paspalum virgatum var. *jacquinianum* Flügge, Monogr. Pasp. 190. 1810. West Indies, *Jacquin.*

Paspalum virgatum var. *willdenowianum* Flügge, Monogr. Pasp. 190. 1810. Para, Brazil.

Paspalum virgatum var. *stramineum* Griseb., Fl. Brit. W.Ind. 543. 1864. Antigua, *Wullschlaegel* [the other specimen cited belongs to *P. arundinaceum* Poir.].

Paspalum leucocheilum Wright, An. Acad. Cienc. Habana 8: 203. 1871; Fl. Cub. 194. 1873. Isla de Pinos, *Blain.*

Paspalum virgatum var. *ciliatum* Doell, in Mart., Fl. Bras. 2^2: 88. 1877. Based on *P. virgatum* var. *linneanum* Flügge.

(136) PENNISETUM L. Rich.[27]

Pennisetum alopecuroides (L.) Spreng., Syst. Veg. 1: 303. 1825. Based on *Panicum alopecuroides* L.

Panicum alopecuroides L., Sp. Pl. 55. 1753. China.

(1) **Pennisetum glaucum** (L.) R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810. Based on *Panicum glaucum* L.

Panicum glaucum L., Sp. Pl. 56. 1753.[28] India.

Holcus spicatus L., Syst. Nat. ed. 10. 2: 1305. 1759. India.

Pennisetum typhoideum L. Rich., in Pers., Syn. Pl. 1: 72. 1805. Based on *Holcus spicatus* L.

Penicillaria spicata Willd., Enum. Pl. 1037. 1809. Based on *Holcus spicatus* L.

Setaria glauca Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum glaucum* L., but misapplied to *S. lutescens* (Weig.) F. T. Hubb.

Pennisetum spicatum Willd.; Roem. and Schult., Syst. Veg. 2: 499. 1817, as synonym of *Penicillaria spicata* Willd.; Koern., in Koern. and Wern., Handb. Getreidebau. 1: 284. 1885. Based on *Holcus spicatus* L.

Panicum spicatum Roxb., Fl. Ind. 1: 286. 1820. Based on *Holcus spicatus* L.

Penicillaria typhoidea Fig. and DeNot., Agrost. Aegypt. Frag. 55. 1853. Based on *Pennisetum typhoideum* "Delile" (same as L. Rich.).

Chamaeraphis glauca Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum glaucum* L., but misapplied to *Setaria lutescens* (Weig.) F. T. Hubb.

Pennisetum spicatum var. *typhoideum* Dur. and Schinz, Consp. Fl. Afr. 5: 785. 1894. Based on *Penicillaria typhoidea* Fig. and DeNot.

Ixophorus glaucus Nash, Bull. Torrey Bot. Club 22: 423. 1895. Based on *Panicum glaucum* L., but misapplied to *Setaria lutescens* (Weig.) F. T. Hubb.

Chaetochloa glauca Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum glaucum* L., but misapplied to *Setaria lutescens* (Wieg.) F. T. Hubb.

Pennisetum americanum Schum. (in Engl. Pflanzenw. Ost-Afr. 5^B: 51. 1895) based on *Panicum americanum* L. (Sp. Pl. 56. 1753) has been used for this species, but the Linnaean name was based on an unidentifiable figure in Clusius (Rar. Pl. Hist. 2: 215. 1601).

Pennisetum latifolium Spreng., Syst. Veg. 1: 302. 1825. Montevideo, *Sello.*

Pennisetum macrostachyum (Brongn.) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 177. 1834. Based on *Gymnothrix macrostachys* Brongn.

Gymnothrix macrostachys Brongn., in Duperrey, Bot. Voy. Coquille 2^2: 104. pl. 10. 1830. Moluccas.

(3) **Pennisetum nervosum** (Nees) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 177. 1834. Based on *Gymnothrix nervosa* Nees.

Gymnothrix nervosa Nees, Agrost. Bras. 277. 1829. Bahia, Brazil.

Cenchrus nervosus Kuntze, Rev. Gen. Pl. 3^2: 347. 1898. Based on *Gymnothrix nervosa* Nees.

Pennisetum purpureum Schumach., Beskr. Guin. Pl. 64. 1827. Guinea, Africa.

(5) **Pennisetum ruppelii** Steud., Syn. Pl. Glum. 1: 107. 1854. Abyssinia.

(2) **Pennisetum setosum** (Swartz) L. Rich., in Pers., Syn. Pl. 1: 72. 1805. Based on *Cenchrus setosus* Swartz.

Cenchrus setosus Swartz, Prodr. Veg. Ind. Occ. 26. 1788. West Indies.

Panicum cenchroides L. Rich., Act. Soc. Hist. Nat. (Paris) 1: 106. 1792 French Guiana, *Leblond.*

Panicum crubescens Willd., Enum. Hort. Berol. 1031. 1809. St. Thomas.

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[27] For discussion of types see Chase, Contrib. U.S. Natl. Herb. 22: 213–234. 1921.

[28] For discussion of this name see Chase, Amer. Jour. Bot. 8: 41–49. 1921.

Setaria erubescens Beauv., Ess. Agrost. 51, 169, 178. 1812. Based on *Panicum erubescens* Willd.
Pennisetum purpurascens H.B.K., Nov. Gen. and Sp. 1: 113. 1815. Jorullo, Mexico, *Humboldt* and *Bonpland*.
Pennisetum uniflorum H.B.K., Nov. Gen. and Sp. 1: 114. pl. 34. 1815. Venezuela, *Humboldt* and *Bonpland*.
Setaria cenchroides Roem. and Schult., Syst. Veg. 2: 495. 1817. Based on *Panicum cenchroides* L. Rich.
Gymnothrix geniculata Schult., Mant. 2: 284. 1824. Martinique, *Sieber*.
Pennisetum alopecuroides Desv.; Hamilt., Prodr. Pl. Ind. Occ. 11. 1825. Not *P. alopecuroides* Spreng., 1825. West Indies.
Pennisetum erubescens Link, Hort. Berol. 1: 215. 1827. Based on *Panicum erubescens* Willd.
Pennisetum hirsutum Nees, Agrost. Bras. 284. 1829. Brazil, [*Martius*].
Pennisetum pallidum Nees, Agrost. Bras. 285. 1829. Minas Geraes, Brazil, [*Martius*].
Pennisetum richardi Kunth, Rév. Gram. 1: 49. 1829. Based on *Panicum cenchroides* L. Rich.
Pennisetum sieberi Kunth, Rév. Gram. 1: 50. 1829. Based on *Gymnothrix geniculata* Schult.
Pennisetum flavescens Presl, Rel. Haenk. 1: 316. 1830. Mexico, *Haenke*.
Pennisetum hamiltonii Steud., Nom. Bot. ed. 2. 2: 297. 1841. Based on *P. alopecuroides* Desv.; Hamilt.
Pennisetum nicaraguense Fourn., Bull. Soc. Bot. France II. 27: 293. 1880. Granada, Nicaragua, *Levy* 1304.
Pennisetum indicum var. *purpuraseens* Kuntze, Rev. Gen. Pl. 2: 787. 1891. Based on *Panicum purpurascens* H.B.K.

(4) **Pennisetum villosum** R. Br., in Salt, Voy. Abyss. App. 62. 1814, name only; in Fres., Mus. Senckenb. Abh. 2: 134. 1837. Abyssinia.
Cenchrus villosus Kuntze, Rev. Gen. Pl. 3^2: 347. 1898. Not *C. villosus* Spreng. Based on *Pennisetum villosum* R. Br.

(110) PHALARIS L.

(6) **Phalaris angusta** Nees; Trin., Gram. Icon. 1: pl. 78. 1827. Uruguay and southern Brazil.
Phalaris ludoviciana Torr.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^1: 56. 1839, as synonym of *P. angusta* Nees.
Phalaris laxa Spreng.; Steud., Nom. Bot. ed. 2. 2: 315. 1841, as synonym of *P. angusta* Nees.
Phalaris intermedia var. *angusta* Chapm., Fl. South. U.S. 568. 1860. Based on *P. angusta* Nees.
Phalaris intermedia var. *angustata* Beal, Grasses N.Amer. 2: 182. 1896. "*P. angustata* Hort." [San Diego] Calif., *Pringle* in 1882.

(9) **Phalaris arundinacea** L., Sp. Pl. 55. 1753. Europe. (*P. arundinacea* Michx., listed in Index Kewensis, is the Linnaean species.)
Arundo colorata Ait., Hort. Kew. 1: 116. 1789. Based on *Phalaris arundinacea* L.
Typhoides arundinacea Moench, Meth. Pl. 202. 1794. Based on *Phalaris arundinacea* L.
Calamagrostis variegata With., Bot. Arr. Veg. Brit. ed. 3. 2: 124. 1796. Based on *Phalaris arundinacea* L.
Arundo riparia Salisb., Prodr. Stirp. 24. 1796. Based on *Phalaris arundinacea* L.
Baldingera colorata Gaertn., Mey., and Scherb., Fl. Wett. 1: 96. 1799. Based on *Phalaris arundinacea* L.
Digraphis arundinacea Trin., Fund. Agrost. 127. 1820. Based on *Phalaris arundinacea* L.
Baldingera arundinacea Dum., Obs. Gram. Belg. 130. pl. 10. f. 40. 1823. Based on *Phalaris arundinacea* L.
Digraphis americana Ell.; Loud., Hort. Brit. 27. 1830. No description, *Phalaris arundinacea* Michx. cited, Loudon assuming the American form to be distinct from the European, and that *Phalaris americana* Ell. was the same as the American *P. arundinacea*.
Endallex arundinacea Raf.; Jacks., Ind. Kew. 2: 839. 1893, as synonym of *Phalaris arundinacea* L.

PHALARIS ARUNDINACEA var. PICTA L., Sp. Pl. 55. 1753. Europe.

Phalaris americana var. *picta* Eaton and Wright, N.Amer. Bot. ed. 8. 352. 1840. Massachusetts, Connecticut, New York, Ontario.
Phalaris arundinacea var. *variegata* Parnell, Grasses Brit. 188. pl. 82. 1845. Scotland.
Digraphis arundinacea var. *picta* Pacher, Jahrb. Nat. Landesmus. Kärnt. 14: 119. 1880. Presumably based on *Phalaris arundinacea* var. *picta* L.
(3) **Phalaris brachystachys** Link, Neu. Jour. Bot. Schrad. 1^3: 134. 1806. Based on *P. canariensis* as described by Brotero (Fl. Lusit. 1: 79. 1804). Portugal.
Phalaris canariensis var. *brachystachys* Fedtsch., Bull. Jard. Bot. Prin. U.R.S.S. [Pierre le Grand] 14 (sup. 2): 47. 1915. Based on *P. brachystachys* Link.
(8) **Phalaris californica** Hook. and Arn., Bot. Beechey Voy. 161. 1841. California. This is the species referred to *P. amethystina* Trin., of Chile, by Thurber and others.
(2) **Phalaris canariensis** L., Sp. Pl. 54. 1753. Southern Europe and the Canary Islands.
Phalaris avicularis Salisb., Prodr. Stirp. 17. 1796. Based on *P. canariensis* L.
(5) **Phalaris caroliniana** Walt., Fl. Carol. 74. 1788. South Carolina.
Phalaris intermedia Bosc; Poir., in Lam., Encycl. Sup. 1: 300. 1810. Carolina, *Bosc.*
Phalaris microstachya DC., Cat. Hort. Monsp. 131. 1813. South Carolina, *Fraser; Bosc.*
Phalaris americana Ell., Bot. S.C. and Ga. 1: 101. pl. 5. f. 4. 1816. South Carolina.
Phalaris occidentalis Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 144. 1837. Fort Smith, Ark., on the Arkansas to Red River [*Nuttall*].
Phalaris trivialis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^1: 55. 1839. Charleston, S.C., *Beyrich.*
Phalaris intermedia var. *microstachya* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 512. 1894. Based on *P. microstachya* DC.
(7) **Phalaris lemmoni** Vasey, Contrib. U.S. Natl. Herb. 3: 42. 1892. Santa Cruz, Calif., *Lemmon.*
(4) **Phalaris minor** Retz., Obs. Bot. 3: 8. 1783. Orient.
(1) **Phalaris paradoxa** L., Sp. Pl. ed. 2. 2: 1665. 1763. Mediterranean region.
PHALARIS PARADOXA var. PRAEMORSA (Lam.) Coss. and Dur., Expl. Sci. Alger. 2: 25. 1854. Based on *P. praemorsa* Lam.
Phalaris praemorsa Lam., Fl. Franç. 3: 566. 1778. France.
Phalaris tuberosa L., Mant. Pl. 2: 557. 1771. Europe.
PHALARIS TUBEROSA var. STENOPTERA (Hack.) Hitchc., Jour. Wash. Acad. Sci. 24: 292. 1934. Based on *P. stenoptera* Hack.
Phalaris stenoptera Hack., Repert. Sp. Nov. Fedde 5: 333. 1908. Melbourne, Australia, *Ewart*, cultivated. This species has been referred to *P. bulbosa* (see under *Phleum subulatum*).

(117) PHARUS L.

(1) **Pharus parvifolius** Nash, Bull. Torrey Bot. Club 35: 301. 1908. Haiti *Nash* and *Taylor* 1482.
This is the species described under *Pharus latifolius* L. by Chapman.

(65) PHIPPSIA (Trin.) R. Br.

(1) **Phippsia algida** (Soland.) R. Br., Sup. App. Parry's Voy. 185 [err. for 285]. 1824. Based on *Agrostis algida* Soland.
Agrostis algida Soland., in Phipps Voy. 200. 1810. Arctic regions.
Trichodium algidum Roem. and Schult., Syst. Veg. 2: 283. 1817. Based on *Agrostis algida* Wahl. (same as *A. algida* Soland.).
Colpodium monandrum Trin., in Spreng., Neu. Entd. 2: 37. 1821. Based on *Agrostis algida* Phipps (error for Solander.).
Vilfa algida Trin., Gram. Unifl. 159. 1824. Based on *Agrostis algida* Phipps (error for Solander).
Vilfa monandra Trin., Gram. Unifl. 159. 1824. "Sin. Laurentii" [probably St. Lawrence Island, Alaska], *Chamisso.*
Phippsia monandra Trin., Gram. Unifl. 159. 1824, as synonym of *Vilfa monandra* Trin.; Hook and Arn., Bot. Beechey Voy. 132. 1841. Based on *Vilfa monandra* Trin.

Catabrosa algida Fries, Nov. Fl. Suec. Mant. 3: Add. 173, 174. 1843. Based on *Agrostis algida* Soland.
Poa algida Rupr., Fl. Samoj. Cisural. 61. 1845. Not *P. algida* Trin. Based on *Agrostis algida* Soland.

(72) PHLEUM L.

(2) **Phleum alpinum** L., Sp. Pl. 59. 1753. Europe.
Phleum haenkeanum Presl, Rel. Haenk. 1: 245. 1830. Nootka Sound, Vancouver Island, *Haenke.*
Phleum pratense var. *alpinum* Celak., Prodr. Fl. Böhm. 38. 1869. Based on *P. alpinum* L.
Phleum alpinum var. *americanum* Fourn., Mex. Pl. 2: 90. 1886. Nootka Sound, Vancouver Island, *Haenke.*
Phleum alpinum var. *scribnerianum* Pammel, Davenport Acad. Sci. Proc. 7: 238. 1899. Geranium Park, Wyo., *Pammel* 6.
Plantinia alpina Bubani, Fl. Pyr. 4: 272. 1901. Based on *Phleum alpinum* L.
Phleum arenarium L., Sp. Pl. 60. 1753. Europe.
Phleum paniculatum Huds., Fl. Angl. 23. 1762. England.
Phalaris aspera Retz., Obs. Bot. 4: 14. 1786. Europe.
Phleum asperum Jacq., Coll. Bot. 1: 110. 1786. Europe.
Plantinia aspera Bubani, Nuov. Gior. Bot. Ital. 5: 317. 1873. Based on *Phleum asperum* L. (error for Jacq.)
(1) **Phleum pratense** L., Sp. Pl. 59. 1753. Europe.
Phleum nodosum var. *pratense* St. Amans, Fl. Agen. 23. 1821. Based on *P. pratense* L.
Plantinia pratensis Bubani, Fl. Pyr. 4: 270. 1901. Based on *Phleum pratense* Huds. (error for L.).
Stelephuras pratensis Lunell, Amer. Midl. Nat. 4: 216. 1915. Based on *Phleum pratense* L.
Phleum subulatum (Savi) Aschers. and Graebn., Syn. Mitteleur. Fl. 2: 154. 1899. Based on *Phalaris subulata* Savi.
Phalaris bulbosa L., Cent. Pl. 1: 4. 1755; Amoen. Acad. 4: 264. 1759. Not *Phleum bulbosum* Gouan, 1765. "In Oriente."
Phalaris subulata Savi, Fl. Pis. 1: 57. 1798. Italy.
Phalaris bellardi Willd., Ges. Naturf. Freund. Berlin Neue Schrift. 3: 415. 1801. Europe.
Phalaris tenue Host, Gram. Austr. 2: 27. pl. 36. 1802. Europe.
Phleum tenue Schrad., Fl. Germ. 1: 191. 1806. Based on *Phalaris tenue* Host.
Phleum bellardi Willd., Enum. Pl. 1: 85. 1809. Based on *Phalaris bellardi* Willd.
Phleum bulbosum Richt., Pl. Eur. 1: 37. 1890. Not *P. bulbosum* Gouan, 1765. Based on *Phalaris bulbosa* L.

(49) PHOLIURUS Trin.

(1) **Pholiurus incurvus** (L.) Schinz and Thell., Vierteljahrs. Nat. Gesell. Zürich 66: 265. 1921. Based on *Aegilops incurva* L.
Aegilops incurva L., Sp. Pl. 1051. 1753. Europe.
Aegilops incurvata L., Sp. Pl. ed. 2. 2: 1490. 1763. Europe.
Agrostis incurvata Scop., Fl. Carn. 1: 62. 1772. Based on *Aegilops incurvata* L.
Rottboellia incurvata L. f., Sup. Pl. 114. 1781. Based on *Aegilops incurvata* L.
Ophiurus incurvatus Beauv., Ess. Agrost. 116, 168, 176. 1812. Based on *Rottboellia incurvata* L.
Rottboellia incurva Roem. and Schult., Syst. Veg. 2: 799. 1817. Presumably based on *Aegilops incurva* L.
Lepturus incurvatus Trin., Fund. Agrost. 123. 1820. Based on *Aegilops incurvata* L.
Lepturus filiformis var. *incurvatus* Hook. f., Stud. Fl. 455. 1870. Based on *L. incurvatus* Trin.
Lepturus incurvus Druce, List Brit. Pl. 85. 1908. Based on *Aegilops incurva* L.
Lepturus incurvus subsp. *incurvatus* Briq., Prodr. Fl. Corse 1: 183. 1910. Based on *L. incurvatus* Trin.

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Pholiurus incurvatus Hitchc., U.S. Dept. Agr. Bull. 772: 106. 1920. Based on *Aegilops incurvata* L.

This species has been called *Lepturus filiformis* (Roth) Trin. *Rottboellia filiformis* Roth, upon which that name is based, is considered a doubtful species by some European botanists and as a distinct species of *Pholiurus* by others (*P. filiformis* Schinz and Thell.).

(26) PHRAGMITES Trin.

(1) **Phragmites communis** Trin., Fund. Agrost. 134. 1820. Based on *Arundo phragmites* L.

Arundo phragmites L., Sp. Pl. 81. 1753. Europe.

Arundo vulgaris Lam., Fl. Franç. 3: 615. 1778. Based on *A. phragmites* L. The name is untenable

Arundo palustris Salisb., Prodr. Strip. 24. 1796. Based on *A. phragmites* L.

Reimaria diffusa Spreng., Neu. Entd. 3: 14. 1822. Martinique, *Sieber* [31].

Cynodon phragmites Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Arundo phragmites* L.

Phragmites vulgaris Crép., Man. Fl. Belg. ed. 2. 345. 1866. Based on *Arundo vulgaris* Lam., an untenable name.

Phragmites berlandieri Fourn., Bull. Soc. Bot. France 24: 178. 1877. Laredo, Tex., *Berlandier* 1446.

Phragmites phragmites Karst., Deut. Fl. 379. 1883. Based on *Arundo phragmites* L.

Trichoon phragmites Rendle, Cat. Afr. Pl. Welw. 2^1: 218. 1899. Based on *Arundo phragmites* L.

Oxyanthe phragmites Nieuwl., Amer. Midl. Nat. 3: 332. 1914. Based on *Arundo phragmites* L.

Phragmites communis var. *berlandieri* Fernald, Rhodora 34: 211. 1925. Based on *P. berlandieri* Fourn.

(83) PIPTOCHAETIUM Presl

(1) **Piptochaetium fimbriatum** (H.B.K.) Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. Based on *Stipa fimbriata* H.B.K.

Stipa fimbriata H.B.K., Nov. Gen. and Sp. 1: 126. 1815. Guanajuato, Mexico, *Humboldt* and *Bonpland.*

Milium mexicanum Spreng., Syst. Veg. 1: 251. 1825. Mexico, *Humboldt.*

Piptatherum mexicanum Schult., Mant. 3 (Add. 1): 564. 1827. Based on *Milium mexicanum* Spreng.

Avena stipoides Willd.; Steud., Nom. Bot. ed. 2. 2: 146. 1841, as synonym of *Milium mexicanum* Spreng.

Oryzopsis fimbriata Hemsl., Biol. Centr. Amer. Bot. 3: 538. 1885. Based on *Stipa fimbriata* H.B.K.

Oryzopsis seleri Pilger, Verh. Bot. Ver. Brand. 51: 192. 1909. Guatemala, *Seler* 3238.

(9) PLEUROPOGON R. Br.

(1) **Pleuropogon californicus** (Nees) Benth.; Vasey, Grasses U.S. 40. 1883. Based on *Lophochlaena californica* Nees.

Lophochlaena californica Nees, Ann. Nat. Hist. 1: 283. 1838. California, [*Douglas*].

Pleuropogon douglasii Trin.; Steud., Nom. Bot. ed. 2. 2: 355. 1841. Name only, North America.

Lepitoma brevifolia Torr.; Steud., Nom. Bot. ed. 2. 2: 355. 1841, as synonym of *Pleuropogon douglasii* Trin.

(2) **Pleuropogon refractus** (A. Gray) Benth.; Vasey, Grasses U.S. 40. 1883. Based on *Lophochlaena refracta* A. Gray.

Lophochlaena refracta A. Gray, Amer. Acad. Sci. Proc. 8: 409. 1872. Oregon, [*Hall* 636].

(10) POA L.

(43) **Poa alpina** L., Sp. Pl. 67. 1753. Lapland.

Uralepis mutica Fourn., Mex. Pl. 2: 110. 1886. Not *U. mutica* Fourn.; Hemsl. 1885. Mexico, *Liebmann* 611.

Poa alpina var. *minor* Scribn.; Beal, Grasses N.Amer. 2: 543. 1896. Not *P. alpina* var. *minor* Koch, 1837. Montana, *Scribner* [388] in 1883.

(24) **Poa alsodes** A. Gray, Man. ed. 2. 562. 1856. New England to Wisconsin. [Type, New Hampshire].

Poa dinantha Wood, Class-book 797. 1861. Montgomery, Ala.
This species was described as *Poa nemoralis* L., in Torr., Fl. North. and Mid. U.S. 1: 111. 1823.

(64) **Poa ampla** Merr., Rhodora 4: 145. 1902. Steptoe, Wash., *G. R. Vasey* 3009.
Poa laeviculmis Williams, Bot. Gaz. 36: 55. 1903. Several specimens from Washington and Oregon mentioned, the first being Steptoe, Wash., *G. R. Vasey* 3026.
Poa truncata Rydb., Bull. Torrey Bot. Club 32: 607. 1905. Dillon, Colo., *Clements* 373.
Poa confusa Rydb., Bull. Torrey Bot. Club. 32 : 607. 1905. Medicine Bow Mountains, Wyo., *Nelson* 7787.

(5) **Poa annua** L., Sp. Pl. 68. 1753. Europe.
Aira pumila Pursh, Fl. Amer. Sept. 1: 76. 1814. Pennsylvania.
Poa infirma H.B.K., Nov. Gen. and Sp. 1: 158. 1816. Colombia, *Humboldt* and *Bonpland.*
Megastachya infirma Roem. and Schult., Syst. Veg. 2: 585. 1817. Based on *Poa infirma* H.B.K.
Catabrosa pumila Roem. and Schult., Syst. Veg. 2: 696. 1817. Based on *Aira pumila* Pursh.
Poa aestivalis Presl, Rel. Haenk. 1: 272. 1830. Peru, *Haenke.*
Eragrostis infirma Steud., Nom. Bot. ed. 2. 1: 563, 1840. Based on *Poa infirma* H.B.K.
Poa annua var. *rigidiuscula* L. H. Dewey, Contrib. U.S. Natl. Herb. 3: 262. 1895. Nez Perce County, Idaho, *Sandberg* 134.

(7) **Poa arachnifera** Torr., in Marcy, Expl. Red Riv. 301. 1853. Headwaters of the Trinity River [Ark., *Marcy Exped.*].
Poa densiflora Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1863. Northern Texas.
Poa arachnifera var. *glabrata* Vasey, Descr. Cat. Grasses U.S. 79. 1885, name only, [for staminate plants with glabrous spikelets]; Vasey; Beal, Grasses N.Amer. 2: 535. 1896. [Texas, *Buckley* in 1881.]
Poa glabrescens Nash, in Small, Fl. Southeast. U.S. 154, 1327. 1903. Based on *P. arachnifera* var. *glabrata* Torr. (error for Vasey).

(21) **Poa arctica** R. Br., Sup. App. Parry's Voy. 288 (err. typ. 188). 1823. Melville Island, Arctic America, *Parry.*
Poa grayana Vasey, Contrib. U.S. Natl. Herb. 1: 272. 1893. Grays Peak, Colo., *Patterson* 14 in 1885.
Poa laxa occidentalis Vasey; Rydb. and Shear, U.S.Dept.Agr., Div. Agrost. Bull. 5: 32. 1897. Name only, for *Shear* 690 and *Rydberg* 2440, Grays Peak, Colo.
Poa longipila Nash, in Rydb., Mem. N.Y. Bot. Gard. 1:46. 1900. Electric Peak, Yellowstone Park, *Rydberg* 3614.
Poa alpicola Nash, in Rydb., Mem. N.Y. Bot. Gard. 1:47. 1900. Based on *P. laxa* Haenke as misapplied by Thurber (in Watson, Bot. Calif. 2: 312. 1880).
Poa williamsii Nash, Bull. N.Y. Bot. Gard. 2: 156. 1901. White Pass, Alaska, *Williams* in 1899.
Poa aperta Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 4. 1901. Telluride, Colo., *Shear* 98.
Poa callichroa Rydb., Bull. Torrey Bot. Club. 32: 603. 1905. Dead Lake, near Pikes Peak, Colo., *Clements* 457.
Poa phoenicea Rydb., Bull. Torrey Bot. Club 32: 605. 1905. Pikes Peak Valley, Colo., *Clements* 466.
Poa tricholepis Rydb., Bull. Torrey Bot. Club 32: 606. 1905. Pagosa Peak, Colo., *Baker* 210.
Poa chionogenes Gandog., Bull. Soc. Bot. France 66: 302. 1920. Grays Peak, Colo., *Crandall* [in 1898].
Colorado specimens of this species have been described as *Poa cenisia* All. by some recent American authors.

(19) **Poa arida** Vasey, Contrib. U.S. Natl. Herb. 1: 270. 1893. Socorro, N. Mex., *G. R. Vasey* in 1881.
Poa andina Nutt.; S. Wats., in King, Geol. Expl. 40th Par. 388. 1871. Not *P. andina* Trin., 1836. "Colorado, East and West Humboldt Mountains and in Clover Mountains, Nevada; also in the Trinity Mountains, *Watson* 1319." The name is given as *P. andina* " Nutt., Ms. in Herb.; (not of Trin.).'

Poa californica Munro; Coulter, Man. Rocky Mount. 420. 1885. Not *P. californica* Steud., 1854. Based on *P. andina* Nutt.
Poa andina var. *purpurea* Vasey; Macoun, Cat. Can. Pl. 2[4]: 223. 1888. Name only, for *Macoun* 92, Red Deer Lakes, Alberta.
Poa sheldoni Vasey, Contrib. U.S. Natl. Herb. 1: 276. 1893. Buena Vista, Colo., *Sheldon* 615.
Poa pseudopratensis Scribn. and Rydb., Contrib. U.S. Natl. Herb. 3: 531. pl. 20. 1896. Not *P. pseudopratensis* Beyer, 1819. Hot Springs, S.Dak. *Rydberg* 1151.
Poa pratericola Rydb. and Nash, Mem. N.Y. Bot. Gard. 1: 51. 1900. Based on *P. arida* Vasey.
Poa fendleriana var. *arida* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. arida* Vasey.
Poa pratensis var. *pseudopratensis* Jones, Contrib. West. Bot. 14: 15. 1912. Based on *P. pseudopratensis* Scribn. and Rydb.
Paneion aridum Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa arida* Vasey.
Paneion pratericola Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Poa pratericola* Rydb. and Nash.
Poa pratensiformis Rydb., Fl. Rocky Mount. 79. 1917. Based on *P. pseudopratensis* Scribn. and Rydb.
Poa overi Rydb., Brittonia 1: 84. 1931. Custer County, S.Dak., *Over* 18100.
(12) **Poa atropurpurea** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 53. pl. 10. 1898. Bear Valley, San Bernardino Mountains, Calif., *Parish* 2968.
(42) **Poa autumnalis** Muhl.; Ell., Bot. S.C. and Ga. 1: 159. 1816. Columbia, S.C., *Herbemont.*
Poa flexuosa Muhl., Descr. Gram. 148. 1817. Not *P. flexuosa* Smith, 1800. Virginia, Carolina, and Cherokee [Tennessee].
Poa campyle Schult., Mant. 2: 304. 1824. Based on *P. flexuosa* Muhl.
Poa elliottii Spreng., Syst. Veg. 1: 338. 1825. Based on *P. autumnalis* Muhl.
Poa vestita Bosc; Steud., Nom. Bot. ed. 2. 2: 363. 1841. Name only. Carolina.
Poa hexantha Wood, Class-book 797. 1861. Atlanta, Ga.
(3) **Poa bigelovii** Vasey and Scribn.; Vasey, Descr. Cat. Grasses U.S. 81. 1885. Based on *P. annua* var. *stricta* Vasey.
Poa annua var. *stricta* Vasey, Bull. Torrey Bot. Club 10: 31. 1883. Rillita River, Ariz., *Pringle.*
(1) **Poa bolanderi** Vasey, Bot. Gaz. 7: 32. 1882. [Yosemite National Park], Calif., *Bolander* 6115.
Poa howellii chandleri Davy, Univ. Calif. Pubs., Bot. 1: 60. 1902. Siskiyou County, Calif., *Chandler* 1703.
Poa bolanderi chandleri Piper, Contrib. U.S. Natl. Herb. 11: 132. 1906. Based on *P. howellii chandleri* Davy.
(35) **Poa bulbosa** L., Sp. Pl. 70. 1753. France.
Poa bulbosa var. *vivipara* Koel., Descr. Gram. 189. 1802. Europe.
Paneion bulbosum var. *viviparum* Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa bulbosum* var. *vivipara* Koch (same as Koel.).
(60) **Poa canbyi** (Scribn.) Piper, Contrib. U.S. Natl. Herb. 11: 132. 1906. Based on *Glyceria canbyi* Scribn.
Aira brevifolia Pursh, Fl. Amer. Sept. 1: 76. 1814. Not *Poa brevifolia* DC. Plains of the Missouri, *Lewis.*
Airopsis brevifolia Roem. and Schult., Syst. Veg. 2: 578. 1817. Based on *Aira brevifolia* Pursh.
Poa tenuifolia Nutt.; S. Wats., in King, Geol. Expl. 40th Par. 5: 387. 1871. Not *P. tenuifolia* L. Rich., 1851. Nevada, *Watson* 1318.
Poa tenuifolia var. *rigida* Vasey, in Wheeler Rept. U.S. Survey 100th Merid. 6: 290. 1878. Name only. Nevada and Colorado [*Wolf*] 1138, 1140.
Poa tenuifolia var. *elongata* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 290. 1878. Nevada, Colorado [Twin Lakes, *Wolf*] 1141.
Glyceria canbyi Scribn., Bull. Torrey Bot. Club 10: 77. 1883. Cascade Mountains, Wash., *Tweedy* and *Brandegee* in 1882.
Aira missurica Spreng.; Jacks., Ind. Kew. 1: 68. 1893, as synonym of *A. brevifolia* Pursh, erroneously credited to "Spreng. Syst. 2: 578." *Aira brevifolia* Pursh is given in Spreng., Syst. 1: 276. 1825.
Poa laevis Vasey, Contrib. U.S. Natl. Herb. 1: 273. 1893. Not *P. laevis* R. Br., 1810. Montana, *Scribner* in 1883.
Poa lucida Vasey, Contrib. U.S. Natl. Herb. 1: 274. 1893. Georgetown, Colo., *Patterson* 73.

Atropis laevis Beal, Grasses N.Amer. 2: 577. 1896. Based on *Poa laevis* Vasey.

Atropis laevis var. *rigida* Beal, Grasses N.Amer. 2: 578. 1896. Utah, *Jones*.

Atropis canbyi Beal, Grasses N.Amer. 2: 580. 1896. Based on *Glyceria canbyi* Scribn.

Poa laevigata Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 5: 31. 1897. Based on *P. laevis* Vasey.

Poa wyomingensis Scribn., Davenport Acad. Sci. Proc. 7: 242. 1899. Big Horn, Sheridan County, Wyo., *Pammel* 192.

Poa leckenbyi Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 2. 1899. Scott, Klickitat County, Wash., *Leckenby* in 1898.

Poa helleri Rydb., Bull. Torrey Bot. Club 36: 534. 1909. Lake Waha, Idaho, *Heller* 3274.

Poa buckleyana var. *elongata* Jones, Contrib. West. Bot. 14: 14. 1912. Based on "*P. andina* var. *elongata* Vasey", error for *P. tenuifolia* var. *elongata* Vasey.

Poa nevadensis var. *laevigata* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. laevigata* Scribn.

Poa nevadensis var. *leckenbyi* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. leckenbyi* Scribn.

(4) **Poa chapmaniana** Scribn., Bull. Torrey Bot. Club 21: 38. 1894. Knoxville, Tenn., *Scribner*. "*P. cristata* Chapm. not Walter" cited as synonym, but what Chapman described as *Poa cristata* Walt. is dubious. Scribner's description is ample, and the type is in the National Herbarium.

(6) **Poa compressa** L., Sp. Pl. 69. 1753. Europe and North America.

Poa compressa var. *sylvestris* Torr., Fl. North. and Mid. U.S. 1: 110. 1823. New York.

Poa compressa forma *depauperata* Millsp., Fl. W.Va. 472. 1892. Monongalia, along Falling Run, W.Va.

Paneion compressum Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa compressa* L.

(10) **Poa confinis** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13²: pl. 75. 1893. Oregon to Alaska [type Tillamook Bay, Oreg., *Howell* 69 in 1882].

(13) **Poa curta** Rydb., Bull. Torrey Bot. Club 36: 534. 1909. Spread Creek [Jackson Hole], Wyo., *Tweedy* 13.

(62) **Poa curtifolia** Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 16: 3. 1899. Mt. Stuart, Wash., *Elmer* 1148 [type] and 1150.

(50) **Poa cusickii** Vasey, Contrib. U.S. Natl. Herb. 1: 271. 1893. Oregon, *Cusick* 1219.

Poa filifolia Vasey, Contrib. U.S. Natl. Herb. 1: 271. 1893. Hatwai Creek, Nez Perce County, Idaho, *Sandberg* 138.

Poa idahoensis Beal, Grasses N.Amer. 2: 539. 1896. Based on *P. filifolia* Vasey, not *P. filifolia* Schur, that name, however, published as synonym only.

Poa subaristata Scribn.; Beal, Grasses N.Amer. 2: 533. 1896. Not *P. subaristata* Phil., 1896 [earlier than *P. subaristata* Scribn.]. Yellowstone Park, *Tweedy* 633.

Poa scabrifolia Heller, Bull. Torrey Bot. Club 24: 310. 1897. Based on *P. filifolia* Vasey.

Poa spillmani Piper, Erythea 7: 102. 1899. Douglas County, Wash., *Spillman* in 1896.

Poa capillarifolia Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 1. 1899. California, *Hansen* 2614.

Poa cottoni Piper, Biol. Soc. Wash. Proc. 18: 146. 1905. Rattlesnake Mountains, Yakima County, Wash., *Cotton* 557.

Poa nematophylla Rydb., Bull. Torrey Bot. Club 32: 606. 1905. Meeker, Colo., *Osterhout* 2601.

Poa scaberrima Rydb., Bull. Torrey Bot. Club 36: 534. 1909. Beaver Canyon, Idaho, *Rydberg* 2055.

(18) **Poa cuspidata** Nutt., in Barton, Compend. Fl. Phila. 1: 61. 1818. Based on *P. pungens* Nutt.

Aira triflora Ell., Bot. S.C. and Ga. 1: 153. 1816. Not *Poa triflora* Gilib., 1792. Athens, Ga., *Green*.

Poa brevifolia Muhl., Descr. Gram. 138. 1817. Not *P. brevifolia* DC., 1806. Pennsylvania.

Poa trinervata Willd.; Muhl., Descr. Gram. 138. 1817, as synonym of *Poa brevifolia* Muhl.

Poa pungens Nutt., Gen. Pl. 1: 66. 1818. Not *P. pungens* Georgi, 1800, nor Bieb., 1808. Near Philadelphia.
Poa brachyphylla Schult., Mant. 2: 304. 1824. Based on *P. brevifolia* Muhl.
Triodia greenii Spreng., Syst. Veg. 1: 330. 1825. Based on *Aira triflora* Ell.
Graphephorum elliottii Kunth, Rév. Gram. 1: 80. 1829. Based on *Aira triflora* Ell.
Graphephorum melicoides var. *triflorum* Wood, Amer. Bot. and Flor. pt. 2: 398. 1870. Based on *Aira triflora* Ell.

(9) **Poa douglasii** Nees, Ann. Nat. Hist. 1: 284. 1838. California, *Douglas.*
Poa californica Steud., Syn. Pl. Glum. 1: 261. 1854. California.
Brizopyrum douglasii Hook. and Arn., Bot. Beechey Voy. Suppl. 404. 1840. Based on *Poa douglasii* Nees.

(52) **Poa epilis** Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 5. 1899. Buffalo Pass, Colo., *Shear* and *Bessey* 1457.
Poa purpurascens Vasey, Bot. Gaz. 6: 297. 1881. Not *P. purpurascens* Spreng., 1819. Mount Hood, *Howell* [in 1881].
Poa alpina var. *purpurascens* Beal, Grasses N.Amer. 2: 543. 1896. Based on *P. purpurascens* Vasey.
Poa paddensis Williams, U.S.Dept.Agr., Div. Agrost. Bull. 17 (ed. 2): 261. f. 557. 1901. Based on *P. purpurascens* Vasey.
Poa subpurpurea Rydb., Bull. Torrey Bot. Club 32: 606. 1905. Based on *P. purpurascens* Vasey.
Poa purpurascens var. *epilis* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. epilis* Scribn.

(40) **Poa fendleriana** (Steud.) Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13²: pl. 74. 1893. Based on *Eragrostis fendleriana* Steud.
Eragrostis fendleriana Steud., Syn. Pl. Glum. 1: 278. 1854. "Mexico" [now New Mexico], *Fendler* 932.
Uralepis poaeoides Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 94. 1863. New Mexico, *Fendler* 932.
Atropis californica Munro; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863. California, *Douglas* in 1833.
Poa eatoni S. Wats., in King, Geol. Expl. 40th Par. 5: 386. 1871. Wasatch Mountains, Utah, *Eaton* [in 1869].
Poa andina var. *major* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 290. 1878. Arizona; Colorado.
Poa andina var. *spicata* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 290. 1878. Colorado. [*Wolf*] 1135.
Atropis californica Munro; Thurb., in S. Wats., Bot. Calif. 2: 309. 1880. Near San Francisco, *Bolander;* Monterey, *Hartweg.*
Poa californica Scribn., Bull. Torrey Bot. Club 10: 31. 1883. Not *P. californica* Steud., 1854. Based on *Atropis californica* Munro.
Panicularia fendleriana Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Eragrostis fendleriana* Steud.
Atropis fendleriana Beal, Grasses N.Amer. 2: 576. 1896. Based on *Eragrostis fendleriana* Steud.
Poa fendleriana spicata Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 5: 31. 1897. Based on *P. arida* var. *spicata* Vasey, error for *P. andina* var. *spicata* Vasey.
Poa longepedunculata Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 54. pl. 11. 1898. Laramie, Wyo., *Nelson* [3292].
Poa brevipaniculata Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 2. 1899. Table Rock, Colo., *Breninger* 554.
Poa scabriuscula Williams, U.S.Dept.Agr., Div. Agrost. Circ. 10: 4. 1899. Glenwood, Utah, *Ward* 136.
Poa longepedunculata viridescens Williams, U.S.Dept.Agr., Div. Agrost. Circ. 10: 4. 1899. Sheep Mountain [near Laramie], Wyo., *Williams* 2302.
Poa brevipaniculata subpallida Williams, U.S.Dept.Agr., Div. Agrost. Circ. 10: 5. 1899. Rocky Mountains, Colo., *Hall* and *Harbour* 674 in part.
Poa fendleriana arizonica Williams, U.S.Dept.Agr., Div. Agrost. Circ. 10: 5. 1899. Yavapai Creek, Ariz., *Rusby* in 1883.

(45) **Poa glauca** Vahl, Fl. Dan. pl. 964. 1790. Norway.
Poa caesia J. E. Smith, Fl. Brit. 1: 103. 1800. England.
Poa nemoralis var. *glauca* Gaud., Agrost. Helv. 1: 182. 1811. Based on *P. glauca* Vahl.
Poa glauca var. *caesia* Syme, in Sowerby, English Bot. ed. 3. 11: 118. 1873. Based on *P. caesia* Smith.
Paneion glaucum Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa glauca* Vahl.

(20) **Poa glaucifolia** Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 10: 6. 1899. Based on *P. planifolia* Scribn. and Williams.

Poa planifolia Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 3. 1899. Not *P. planifolia* Kuntze, 1898. Spring Creek, Big Horn Basin, Wyo., *Williams* 2814.

Poa plattensis Rydb., Brittonia 1: 84. 1931. Lawrence Fork, Nebr., *Rydberg* 461.

(58) **Poa gracillima** Vasey, Contrib. U.S.Natl. Herb. 1: 272. 1893. Mount Adams, Wash., *Suksdorf* 33.

Sporobolus bolanderi Vasey, Bot. Gaz. 11: 337. 1886. Not *Poa bolanderi* Vasey, 1882. Multnomah Falls, Oreg., *Bolander*. [The type an overmature specimen from which all but the lowermost floret had fallen from the spikelets.]

Atropis tenuifolia var. *stenophylla* Vasey; Beal, Grasses N.Amer. 2: 580. 1896. [Roseburg], Oreg., *Howell* in 1887.

Poa saxatilis Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 1. 1899. Mt. Rainier, Wash., *Piper* 1964.

Poa tenerrima Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 4. 1899. California.

Poa invaginata Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 6. 1899. Summit Camp, Sierra Nevada, Calif.

Poa multnomae Piper, Bull. Torrey Bot. Club 32: 435. 1905. Multnomah Falls, Oreg., *Piper* 6459.

Poa alcea Piper, Bull. Torrey Bot. Club 32: 436. 1905. Portland, Oreg., *Piper* 6463.

Poa buckleyana var. *stenophylla* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *Atropis tenuifolia* var. *stenophylla* Vasey.

Poa gracillima var. *saxatilis* Hack., Allg. Bot. Ztschr. 21: 79. 1915. Based on *P. saxatilis* Scribn. and Williams.

Poa englishii St. John and Hardin, Mazama 11: 64. 1929. Mount Baker National Forest, *Hardin* and *English* 1391.

(2) **Poa howellii** Vasey and Scribn., U.S.Dept.Agr., Div. Bot. Bull. 13[2]: pl. 78. 1893. California to Oregon. [Portland, *Howell* 25 in 1881, type.]

Poa howellii var. *microsperma* Vasey, Contrib. U. S. Natl. Herb. 1: 273. 1893. Santa Cruz, Calif., *Anderson* 99.

Poa bolanderi var. *howellii* Jones, Contrib. West. Bot. 14: 15. 1912. Based on *P. howellii* Vasey and Scribn.

(39) **Poa interior** Rydb., Bull. Torrey Bot. Club 32: 604. 1905. Headwaters of Clear Creek and Crazy Woman River, Wyo., *Tweedy* 3706.

Poa caesia var. *strictior* A. Gray, Man. ed. 5. 629. 1867. "Lake Superior, *C. G. Loring*, especially Isle Royale, *Prof. Whitney*."

Poa coloradensis Vasey; Pammel, U.S.Dept.Agr., Div. Agrost. Bull. 9: 41. 1897. Name only, for a specimen collected by Pammel in Colorado in 1895–96.

Poa subtrivialis Rydb., Bull. Torrey Bot. Club 36: 536. 1909. Big Horn Mountains, Wyo., *Tweedy* 2141.

Poa glauca var. *strictior* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. caesia* var. *strictior* A. Gray.

Paneion interius Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa interior* Rydb.

(49) **Poa involuta** Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Chisos Mountains, Brewster County, Tex., *Ferris* and *Duncan* 2811.

(63) **Poa juncifolia** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 52. pl. 8. 1898. Point of Rocks, Sweetwater County, Wyo., *Nelson* 3721.

Poa brachyglossa Piper, Biol. Soc. Wash. Proc. 18: 145. 1905. Douglas County, Wash., *Sandberg* and *Leiberg* 267.

Poa fendleriana var. *juncifolia* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. juncifolia* Scribn.

(15) **Poa kelloggii** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13[2]: pl. 79. 1893. [Mendocino County], Calif., *Bolander* 4705.

Poa bolanderi var. *kelloggii* Jones, Contrib. West. Bot. 14: 15. 1912. Based on *P. kelloggii* Vasey.

(25) **Poa languida** Hitchc., Biol. Soc. Wash. Proc. 41: 158. 1928. Based on *P. debilis* Torr.

Poa debilis Torr., Fl. N.Y. 2: 459. 1843. Not *P. debilis* Thuill., 1799. [Gorham], New York.

(46) **Poa laxa** Haenke, in Jirasek, Beob. Riesengeb. 118. 1791. Europe.
Poa laxa var. *debilior* Jones, Contrib. West. Bot. 14: 15. 1912. "The eastern plant", no particular locality nor specimen cited.

(16) **Poa laxiflora** Buckl., Acad. Nat. Sci., Phila. Proc. 1862: 96. 1863. Columbia Woods, Oreg., *Nuttall.*
Poa leptocoma elatior Scribn. and Merr., Contrib. U.S. Natl. Herb. 13: 71. 1910. Cape Fox, Alaska, *Trelease* and *Saunders* 2982.
Poa remissa Hitchc., Biol. Soc. Wash. Proc. 41: 158. 1928. Sol Duc Hot Springs, Olympic Mountains, Wash., *Hitchcock* 23468.

(56) **Poa leibergii** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 8: 6. pl. 2. 1897. Owyhee-Malheur Divide, Oreg., *Leiberg* 2171.
Poa hanseni Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 53. pl. 9. 1898. Silver Lake, Amador County, Calif., *Hansen* 605.
Poa pringlei var. *hanseni* Smiley, Univ. Calif. Pubs., Bot. 9: 104. 1921. Based on *P. hanseni* Scribn.

(33) **Poa leptocoma** Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 374. 1830. Sitka, Alaska, *Mertens.*
Poa stenantha var. *leptocoma* Griseb., in Ledeb., Fl. Ross. 4: 373. 1853. Based on *P. leptocoma* Trin.
Poa crandallii Gandog., Bull. Soc. Bot. France 66[7]: 301. 1920. Mountains of Larimer, Colo., *Crandall* in 1898.

(55) **Poa lettermani** Vasey, Contrib. U.S. Natl. Herb. 1: 273. 1893. Grays Peak, Colo., *Letterman* 7.
Poa brandegei Scribn.; Beal, Grasses N.Amer. 2: 544. 1896. Grays Peak, Colo., *Jones* 714.
Atropis lettermani Beal, Grasses N.Amer. 2: 579. 1896. Based on *Poa lettermani* Vasey.

(41) **Poa longiligula** Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 3. 1899. Silver Reef, Utah, *Jones* 5149.
Poa montana Vasey, U.S.Dept.Agr., Monthly Rept. 155. 1874. Not *P. montana* All., 1785. Nevada, *Watson* 1312.
Poa longiligula wyomingensis Williams, U.S.Dept.Agr., Div. Agrost. Circ. 10: 3. 1899. Tipton, Wyo., *Nelson* 4799a.
Paneion longiligulum Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa longiligula* Scribn. and Williams.
This species was referred to *Poa alpina* L. by Watson, in King, Geol. Expl. 40th Par. 5: 386. 1871.

(8) **Poa macrantha** Vasey, Bull. Torrey Bot. Club 15: 11. 1888. Mouth of Columbia River, Oreg., *Howell* [in 1887].
Melica macrantha Beal, Bull. Torrey Bot. Club 17: 153. 1890. Based on *Poa macrantha* Vasey.

(37) **Poa macroclada** Rydb., Bull. Torrey Bot. Club 32: 604. 1905. Rogers, Gunnison Watershed, Colo., *Baker* 802.

(23) **Poa marcida** Hitchc., Biol. Soc. Wash. Proc. 41: 158. 1928. Sol Duc Hot Springs, Olympic Mountains, Wash., *Hitchcock* 23466.

(36) **Poa nemoralis** L., Sp. Pl. 69. 1753. Europe.
Paneion nemorale Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa nemoralis* L.

(14) **Poa nervosa** (Hook.) Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13[2]: pl. 81. 1893. Based on *Festuca nervosa* Hook.
Festuca nervosa Hook., Fl. Bor. Amer. 2: 251. pl. 232. 1840. Nootka Sound, Vancouver Island, *Scouler.*
Poa columbiensis Steud., Syn. Pl. Glum. 1: 261. 1854. Columbia River, *Douglas.*
Poa wheeleri Vasey, Cat. Pl. Survey W. 100th Merid. 55. 1874. South Park, Colo., [*Wolf*] 1131 [1131a].
Poa pulchella var. *major* Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13[2]: pl. 82. 1893. Southern Oregon, no specimen cited, and none so named by Vasey can be found.
Poa vaseyana Scribn.; Beal, Grasses N.Amer. 2: 532. 1896. [Georgetown], Colo., *Patterson* in 1885.
Poa cuspidata Vasey; Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 6. 1899. Not *P. cuspidata* Nutt., 1818. As synonym of *P. wheeleri* Vasey.
Poa olneyae Piper, Erythea 7: 101. 1899. Spokane, Wash., *Piper* 2820.
Poa subreflexa Rydb., Bull. Torrey Bot. Club 36: 535. 1909. Steamboat Springs, Colo., *State Agricultural College* 3731.

(61) **Poa nevadensis** Vasey; Scribn., Bull. Torrey Bot. Club 10: 66. 1883. [Austin, Nev., *Jones* in 1882.]

Atropis pauciflora Thurb., in S. Wats., Bot. Calif. 2: 310. 1880. Not *Poa pauciflora* Roem. and Schult., 1817. Sierra Valley, Calif., *Lemmon* 1871. (Though credited to Lemmon the type specimen appears to have been collected by Bolander, Lemmon's name not appearing on the label.)

Poa pauciflora Benth.; Vasey, Grasses U.S. 42. 1883. Not *P. pauciflora* Roem. and Schult., 1817. Based on *Atropis pauciflora* Thurb.

Poa tenuifolia var. *scabra* Vasey; Scribn., Bull. Torrey Bot. Club 10: 66. 1883, as synonym of *P. nevadensis*. [California, *Lemmon*.]

Panicularia thurberiana Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Atropis pauciflora* Thurb.

Poa thurberiana Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13²: pl. 84. 1893. The name based on *Panicularia thurberiana* Kuntze, but the plant described and figured is *Melica imperfecta* Trin.

Atropis nevadensis Beal, Grasses N.Amer. 2: 577. 1896. Based on *Poa nevadensis* Vasey.

(27) **Poa occidentalis** Vasey, Contrib. U.S. Natl. Herb. 1: 274. 1893. Las Vegas, N.Mex., *G. R. Vasey* in 1881.

Poa flexuosa var. *occidentalis* Vasey, in Wheeler, Rept. U.S. Survey 100th Merid. 6: 290. 1878. Twin Lakes, Colo. [*Wolf*] 1132.

Poa trivialis var. *occidentalis* Vasey, Descr. Cat. Grasses U.S. 85. 1885. Colorado and New Mexico, the type being the specimen later described as *P. occidentalis* Vasey.

Poa flexuosa var. *robusta* Vasey, Contrib. U.S. Natl. Herb. 1: 271. 1893. Rocky Mountains, Colo., *Vasey* 673 [Powell's Expedition].

Poa autumnalis var. *robusta* Beal, Grasses N.Amer. 2: 534. 1896. Based on *P. flexuosa* var. *robusta* Vasey.

Poa occidentalis Rydb., Mem. N.Y. Bot. Gard. 1: 50. 1900. Based on *P. flexuosa* var. *occidentalis* Vasey.

Poa platyphylla Nash and Rydb., Bull. Torrey Bot. Club 28: 266. 1901. Based on *P. occidentalis* Vasey, the name changed because of *P. flexuosa* var. *occidentalis* Vasey, thought to be different.

Poa lacustris Heller, Muhlenbergia 6: 12. 1910. Based on *P. flexuosa* var. *occidentalis* Vasey.

(34) **Poa paludigena** Fern. and Wieg., Rhodora 20: 126. 1918. Wayne County, N.Y., *Metcalf* and *Wiegand* 7572.

Poa sylvestris var. *palustris* Dudley, Cornell Univ. Bull. 2: 128. 1886. Michigan Hollow, N.Y.

(38) **Poa palustris** L., Syst. Nat. ed. 10. 2: 874. 1759. Europe.

Poa serotina Ehrh., Beitr. Naturk. 6: 83. 1791, name only; Schrad. Fl. Germ. 1: 299. 1806. Europe.

Poa triflora Gilib., Exerc. Phyt. 2: 531. 1792. Europe.

Poa crocata Michx., Fl. Bor. Amer. 1: 68. 1803. Lake Mistassini, Quebec, *Michaux*.

Poa glauca var. *crocata* Jones, Contrib. West. Bot. 14: 15. 1912. Based on *P. crocata* Michx.

Paneion triflorum Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Poa triflora* Gilib.

(47) **Poa pattersoni** Vasey, Contrib. U.S. Natl. Herb. 1: 275. 1893. Grays Peak, Colo., *Patterson* 154.

(32) **Poa paucispicula** Scribn. and Merr., Contrib. U.S. Natl. Herb. 13: 69. pl. 15. 1910. Yakutat Bay, Alaska, *Coville* and *Kearney* 970.

(17) **Poa pratensis** L., Sp. Pl. 67. 1753. Europe.

?*Poa viridis* Schreb.; Pursh, Fl. Amer. Sept. 1: 79. 1814. North America.

Poa angustifolia Ell., Bot. S.C. and Ga. 1: 160. 1816. South Carolina.

Paneion pratense Lunell, Amer. Midl. Nat. 4: 222. 1915. Based on *Poa pratensis* L.

(54) **Poa pringlei** Scribn., Bull. Torrey Bot. Club 10: 31. 1883. Headwaters of the Sacramento River, Calif., *Pringle* [in 1882].

Poa argentea Howell, Bull. Torrey Bot. Club 15: 11. 1888. [Ashland Butte], Siskiyou Mountains, Oreg., *Howell* [in 1887].

Melica argentea Beal, Bull. Torrey Bot. Club 17: 153. 1890. Based on *Poa argentea* Howell.

Melica nana Beal, Grasses N.Amer. 2: 504. 1896. Based on *Poa argentea* Howell. Name changed because of "*M. argentea* Desv." [error for *M. argentata* Desv.].

Atropis suksdorfii Beal, Grasses N.Amer. 2: 574. 1896. [Mount Adams], Wash., *Suksdorf* 1116. Beal gives as synonym "*Poa suksdorfii* Vasey ined."

Atropis pringlei Beal, Grasses N.Amer. 2: 578. 1896. Based on *Poa pringlei* Scribn.

Poa suksdorfii Vasey; Piper, Contrib. U.S. Natl. Herb. 11: 135. 1906. Based on *Atropis suksdorfii* Beal.

(30) **Poa reflexa** Vasey and Scribn., Contrib. U.S. Natl. Herb. 1: 276. 1893. Kelso Mountain, near Torrey Peak, Colo., *Letterman* in 1885.

Poa acuminata Scribn.; Beal, Grasses N.Amer. 2: 538. 1896. [Mount Blackmore], Mont., *Tweedy* 639 in 1885, 1027 in 1886.

Poa pudica Rydb., Bull. Torrey Bot. Club 32: 603. 1905. Near Grays Peak, Colo., *Rydberg* 2443.

Poa leptocoma var. *reflexa* Jones, Contrib. West. Bot. 14: 15. 1912. Based on *P. reflexa* Vasey and Scribn.

(11) **Poa rhizomata** Hitchc., in Jepson, Fl. Calif. 1: 155. 1912. Oro Fino, Siskiyou County, Calif., *Butler* 1205.

Poa piperi Hitchc., in Abrams, Illustr. Fl. 1: 201. f. 461. 1923. Waldo, Oreg., *Piper* 6496.

(48) **Poa rupicola** Nash, Mem. N.Y. Bot. Gard. 1: 49. 1900. Based on *P. rupestris* Vasey.

Poa rupestris Vasey, Bull. Torrey Bot. Club 14: 94. 1887. Not *P. rupestris* With., 1796. Rocky Mountains [*Wolf* 341 in 1873].

(26) **Poa saltuensis** Fern. and Wieg., Rhodora 20: 122. 1918. Gaspé County, Quebec, *Fernald* and *Collins* 357.

Poa debilis var. *acutiflora* Vasey; Macoun, Cat. Can. Pl. 2[1]: 225. 1888. Name only, for *Macoun* 28 and *Burgess* 12 and 13, Truro, Nova Scotia.

Poa saltuensis var. *microlepis* Fern. and Wieg., Rhodora 20: 124. 1918. Newfoundland, *Fernald* and *Wiegand* 4633.

(57) **Poa scabrella** (Thurb.) Benth.; Vasey, Grasses U.S. 42. 1883. Based on *Atropis scabrella* Thurb.

Sclerochloa californica Munro; Benth., Pl. Hartw. 342. 1857. Name only, for *Hartweg* 2035, Sacramento Valley, Calif.

Poa tenuifolia Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1863. Not *P. tenuifolia* A. Rich., 1851. Columbia River, *Nuttall.*

Atropis scabrella Thurb., in S. Wats., Bot. Calif. 2: 310. 1880. Oakland, Calif., *Bolander.*

Atropis tenuifolia Thurb., in S. Wats., Bot. Calif. 2: 310. 1880. Based on *Poa tenuifolia* Buckl.; Thurb.

Poa orcuttiana Vasey, West Amer. Sci. 3: 165. 1887. San Diego, Calif., *Orcutt* [1070] in 1884.

Panicularia scabrella Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on *Atropis scabrella* Thurb.

Panicularia nuttalliana Kuntze, Rev. Gen. Pl. 2: 783. 1891. Based on "*Atropis tenuifolia* Thurb., *Poa tenuifolia* Nutt., 1862" (error for Buckl.).

Poa buckleyana Nash, Bull. Torrey Bot. Club 22: 465. 1895. Based on *P. tenuifolia* Buckl.

Poa capillaris Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 51. f. 11. 1898. Not *P. capillaris* L., 1753. Potrero, Calif.

Poa nudata Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 1. 1899. Based on *P. capillaris* Scribn.

Poa acutiglumis Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 4. 1899. Grave Creek, Oreg., *Howell* in 1884.

Poa limosa Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 5. 1899. Mono Lake, Calif., *Bolander.*

(59) **Poa secunda** Presl, Rel. Haenk. 1: 271. 1830. Chile, *Haenke.*

Poa sandbergii Vasey, Contrib. U.S. Natl. Herb. 1: 276. 1893. Lewiston, Idaho, *Sandberg* 164.

Poa incurva Scribn. and Williams, U.S.Dept.Agr., Div. Agrost. Circ. 9: 6. 1899. Duckaloose Glacier, Olympic Mountains, Wash., *Piper* 1989.

Poa buckleyana var. *sandbergii* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. sandbergii* Vasey.

Paneion sandbergii Lunell, Amer. Midl. Nat. 4: 223. 1915. Based on *Poa sandbergii* Vasey.

(44) **Poa stenantha** Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 376. 1830. Kamchatka, Unalaska, Sitka, Karaghinski Island.

(29) **Poa sylvestris** A. Gray, Man. 596. 1848. Ohio and Kentucky, *Short, Sullivant,* Michigan and southwestward [type from Ohio, *Short* in 1842].

(28) **Poa tracyi** Vasey, Bull. Torrey Bot. Club 15: 49. 1888. Raton, N.Mex., *Tracy* in 1887.

Poa nervosa var. *tracyi* Beal, Grasses N.Amer. 2: 538. 1896. Based on *P. tracyi* Vasey.

(22) **Poa trivialis** L., Sp. Pl. 67. 1753. Europe.

Poa stolonifera Hall.; Muhl., Descr. Gram. 139. 1817. Pennsylvania.

Poa trivialis var. *filiculmis* Scribn.; Beal, Grasses N.Amer. 2: 532. 1896. Vancouver Island, *Macoun* 282.

Poa callida Rydb., Bull. Torrey Bot. Club 36: 533. 1909. Helena, Mont., *Rydberg* 2145.

(51) **Poa unilateralis** Scribn.; Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13²: pl. 85. 1893. San Francisco, Calif., [*Jones* 15 in 1882].

Atropis unilateralis Beal, Grasses N.Amer. 2: 581. 1896. Based on *Poa unilateralis* Scribn.

Poa pachypholis Piper, Biol. Soc. Wash. Proc. 18: 146. 1905. Ilwaco, Wash., *Piper* [4900].

(53) **Poa vaseyochloa** Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 9: 1. 1899. Based on *P. pulchella* Vasey.

Poa pulchella Vasey, Bot. Gaz. 7: 32. 1882. Not *P. pulchella* Salisb., 1796. Columbia River [mountains, Klickitat County, Wash.], *Suksdorf* [in 1881].

Atropis pulchella Beal, Grasses N.Amer. 2: 574. 1896. Based on *Poa pulchella* Vasey.

Poa gracillima var. *vaseyochloa* Jones, Contrib. West. Bot. 14: 14. 1912. Based on *P. vascyochloa* Scribn.

(31) **Poa wolfii** Scribn., Bull. Torrey Bot. Club. 21: 228. 1894. [Canton], Ill., *Wolf* [in 1882].

Poa alsodes var. *wolfii* Vasey; Scribn., Bull. Torrey Bot. Club 21: 228. 1894, as synonym of *P. wolfii* Scribn.

(70) POLYPOGON Desf.

(4) **Polypogon australis** Brongn., in Duperrey, Bot. Voy. Coquille 2²: 21. 1830. Concepción, Chile.

Polypogon crinitus Trin., Gram. Unifl. 171. 1824. Not *P. crinitus* Nutt., 1818. Chile, *Chamisso.*

Polypogon interruptus var. *crinitus* Hack.; Stuck., An. Mus. Nac. Buenos Aires 13: 473. 1906. Based on *P. crinitus* Trin.

(3) **Polypogon lutosus** (Poir.) Hitchc., U.S.Dept.Agr., Bull. 772: 138. 1920. Based on *Agrostis lutosa* Poir.

Agrostis littoralis With., Bot. Arr. Veg. Brit. ed. 3. 2: 129. pl. 23. 1796. Not *A. littoralis* Lam., 1791. England.

Polypogon littoralis J. E. Smith, Comp. Fl. Brit. 13. 1800. Based on *Agrostis littoralis* With.

Agrostis lutosa Poir., in Lam., Encycl. Sup. 1: 249. 1810. Based on *A. littoralis* With.

Vilfa lutosa Beauv., Ess. Agrost. 16, 148, 181. 1812. Based on *Agrostis lutosa* Poir.

Polypogon interruptus H.B.K., Nov. Gen. and Sp. 1: 134. pl. 44. 1815. Venezuela, *Humboldt* and *Bonpland.*

Alopecurus interruptus Poir., in Lam., Encycl. Sup. 5: 495. 1817. Based on *Polypogon interruptus* H.B.K.

Polypogon lutosus was thought by Duval-Jouve to be a hybrid between *P. monspeliensis* and *Agrostis alba* (Bull. Soc. Bot. France 2: 288. 1875).

(2) **Polypogon maritimus** Willd., Gesell. Naturf. Freund. Berlin (n.s.) 3: 443. 1801. France.

Alopecurus maritimus Poir., in Lam., Encycl. 8: 779. 1808. Based on *Polypogon maritimus* Willd.

Polypogon monspeliensis var. *maritimus* Coss. and Dur., Expl. Sci. Alger. 2: 70. 1867. Based on *P. maritimus* Willd.

(1) **Polypogon monspeliensis** (L.) Desf. Fl. Atlant. 1: 67. 1798. Based on *Alopecurus monspeliensis* L.

Alopecurus monspeliensis L., Sp. Pl. 61. 1753. Europe.

Phleum crinitum Schreb., Beschr. Gräs. 1: 151. 1769. Based on *Alopecurus monspeliensis* L.

Alopecurus aristulatus var. *monspeliensis* Huds., Fl. Angl. 28. 1778. Based on *A. monspeliensis* L.

Agrostis alopecuroides Lam., Tabl. Encycl. 1: 160. 1791. Based on *Alopecurus monspeliensis* L.

Phleum monspeliense Koel., Descr. Gram. 57. 1802. Based on *Alopecurus monspeliensis* L.

Polypogon crinitus Nutt., Gen. Pl. 1: 50. 1818. Based on *Phleum crinitum* Smith (error for Schreb.).
Polypogon flavescens Presl, Rel. Haenk. 1: 234. 1830. Peru, *Haenke.*
Santia monspeliensis Parl., Fl. Palerm. 1: 73. 1845. Based on *Alopecurus monspeliensis* L.

(5) PUCCINELLIA Parl.

(7) **Puccinellia distans** (L.) Parl., Fl. Ital. 367. 1848. Based on *Poa distans* L.
Poa distans L., Mant. Pl. 1: 32. 1767. Europe.
Aira aquatica var. *distans* Huds., Fl. Angl. 34. 1778. Based on *Poa distans* L.
Hydrochloa distans Hartm., Gen. Gram. Skand. 8. 1819. Presumably based on *Poa distans* L.
Glyceria distans Wahl., Fl. Upsal. 36. 1820. Based on *Poa distans* L.
Festuca distans Kunth, Rév. Gram. 1: 129. 1829. Based on *Poa distans* L.
Sclerochloa distans Bab., Man. Brit. Bot. 370. 1843. Based on *Poa distans* L.
Catabrosa distans Link; Heynh., Nom. 2: 126. 1846. Based on *Glyceria distans* Wahl.
Atropis distans Griseb., in Ledeb., Fl. Ross. 4: 388. 1853. Based on *Poa distans* L.
Glyceria distans var. *tenuis* Uechtr., in Crép., Notes Pl. Rar. Belg. 229. 1865. Germany.
Sclerochloa multiculmis subsp. *distans* Syme, in Sowerby, English, Bot. ed. 3. 11: 104. 1873. Based on *Poa distans* L.
Panicularia distans Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Poa distans* L.
Atropis distans var. *tenuis* Rouy, Fl. France 14: 195. 1913. Based on *Glyceria distans* var. *tenuis* Uechtr.
Puccinellia distans var. *tenuis* Fern. and Weath., Rhodora 18: 12. 1916. Based on *Glyceria distans* var. *tenuis* Uechtr.
Puccinellia suksdorfii St. John, Wash. State Coll. Contrib. Dept. Bot. 2: 80. 1928. Rockland, Wash., *Suksdorf* 5089.

(4) **Puccinellia fasciculata** (Torr.) Bicknell, Bull. Torrey Bot. Club 35: 197. 1908. Based on *Poa fasciculata* Torr.
Poa fasciculata Torr., Fl. North. and Mid. U.S. 1: 107. 1823. New York [*Torrey*].
Poa delawarica Link, Hort. Berol. 1: 174. 1827. Delaware.
Festuca delawarica Kunth, Rév. Gram. 1: 129. 1829. Based on *Poa delawarica* Link.
Festuca borreri Bab., Linn. Soc. Trans. 17: 565. 1837. England.
Glyceria delawarica Heynh., Nom. 1: 360. 1840. Based on *Poa delawarica* Link.
Glyceria borreri Bab., in Smith and Sowerby, English Bot. Sup. 3: pl. 2797. 1843. England.
Sclerochloa borreri Bab., Man. Brit. Bot. 370. 1843. Based on *Glyceria borreri* Bab.
Poa borreri Parnell, Grasses Brit. 220. pl. 98. 1845. Based on *Sclerochloa borreri* Bab.
Sclerochloa arenaria var. *fasciculata* A. Gray, Man. 594. 1848. Based on *Poa fasciculata* Torr.
Sclerochloa multiculmis subsp. *borreri* Syme, in Sowerby, English Bot. ed. 3. 11: 105. 1873. Based on *S. borreri* Bab.
Atropis borreri Richt., Pl. Eur. 1: 92. 1890. Based on *Glyceria borreri* Bab.
Puccinellia borreri Hitchc., Rhodora 10: 65. 1908. Based on *Festuca borreri* Bab.

(5) **Puccinellia lemmoni** (Vasey) Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 276. f. 572. 1899. Based on *Poa lemmoni* Vasey.
Poa lemmoni Vasey, Bot. Gaz. 3: 13. 1878. Sierra County, Calif., *Lemmon.*
Glyceria lemmoni Vasey, Descr. Cat. Grasses U.S. 88. 1885, name only; Bull. Torrey Club 13: 119. 1886. Based on *Poa lemmoni* Vasey.
Atropis lemmoni Vasey, U.S.Dept.Agr., Div. Bot. Bull. 13[2]: pl. 90. 1893. Based on *Poa lemmoni* Vasey.
Puccinellia rubida Elmer, Bot. Gaz. 36: 56. 1903. Prineville, Oreg., *Cusick* 2621.

(6) **Puccinellia maritima** (Huds.) Parl., Fl. Ital. 1: 370. 1848. Based on *Poa maritima* Huds.
Poa maritima Huds., Fl. Angl. 35. 1762. England.
Poa maritima Muhl., Descr. Gram. 148. 1817. New England.

Glyceria maritima Wahlb., Fl. Gothob. 17. 1820. Based on *Poa maritima* Huds.

Festuca distans var. *maritima* Mutel, Fl. Franç. 4: 116. 1837. Based on *Poa maritima* Huds.

Poa maritima Bigel., Fl. Bost. ed. 3. 36. 1840. Cambridge and Dorchester, Mass.

Diachroa maritima Nutt.; Steud., Nom. Bot. ed. 2. 1: 497. 1840, as synonym of *Glyceria maritima* Wahlb.

Sclerochloa maritima Lindl., in Bab., Man. Brit. Bot. 370. 1843. Based on *Glyceria maritima* Smith (same as Wahlb.).

Sclerochloa arenaria var. *maritima* A. Gray, Man. 594. 1848. Based on *Poa maritima* Huds.

Atropis maritima Griseb., in Ledeb., Fl. Ross. 4: 389. 1853. Based on *Poa maritima* Huds.

Atropis distans var. *maritima* Coss. and Dur., Expl. Sci. Alger. 2: 141. 1867. Based on *Poa maritima* Huds.

Panicularia maritima Scribn., Mem. Torrey Bot. Club 5: 54. 1894. Based on *Poa maritima* Huds.

(10) **Puccinellia nutkaensis** (Presl) Fern. and Weath., Rhodora 18: 22. f. 49–53. 1916. Based on *Poa nutkaensis* Presl.

Poa nutkaensis Presl, Rel. Haenk. 1: 272. 1830. Nootka Sound, Vancouver Island, *Haenke.*

This species has been referred to *Puccinellia festucaeformis* (Host) Parl., of Europe.

(8) **Puccinellia nuttalliana** (Schult.) Hitchc., in Jepson, Fl. Calif. 1: 162. 1912. Based on *Poa nuttalliana* Schult.

Poa airoides Nutt., Gen. Pl. 1: 68. 1818. Not *P. airoides* Koel., 1802. Mandan, N.Dak., *Nuttall.*

Poa nuttalliana Schult., Mant. 2: 303. 1824. Based on *P. airoides* Nutt.

Festuca nuttalliana Kunth, Rév. Gram. 1: 129. 1829. Based on *Poa nuttalliana* Schult.

Glyceria montana Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 96. 1863. Rocky Mountains, *Nuttall.*

Glyceria airoides A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 336. 1863. Not *G. airoides* Reichenb., 1829. Based on *Poa airoides* Nutt.

Puccinellia airoides Wats. and Coult., in A. Gray, Man. ed. 6. 668. 1890. Based on *Poa airoides* Nutt.

Panicularia distans airoides Scribn., Mem. Torrey Bot. Club 5: 54. 1894. Based on *Poa airoides* Nutt.

Atropis airoides Holm, Bot. Gaz. 46: 427. 1908. Based on *Poa airoides* Nutt.

Puccinellia cusickii Weatherby, Rhodora 18: 182. 1916. Grande Ronde Valley, Oreg., *Cusick* 3271.

Atropis nuttalliana Pilger, Notizbl. Bot. Gart. Berlin 9: 291. 1925. Based on *Poa nuttalliana* Schult.

Wyoming specimens cited by Fernald and Weatherby (Rhodora 18: 16. 1916) under *Puccinellia lucida* (the type from Quebec) are here referred to *P. nuttalliana.*

(1) **Puccinellia parishii** Hitchc., Biol. Soc. Wash. Proc. 41: 157. 1928. Rabbit Springs, Calif., *Parish* 9799.

(9) **Puccinellia pumila** (Vasey) Hitchc., Amer. Jour. Bot. 21: 129. 1934. Based on *Glyceria pumila* Vasey.

Glyceria pumila Vasey, Torrey Bot. Club 15: 48. 1888. Vancouver Island, *Macoun* [in 1887].

Puccinellia maritima var. *minor* S. Wats., in A. Gray, Man. ed. 6. 668. 1890. Mount Desert, Maine, *Rand.*

Glyceria paupercula Holm, Repert. Sp. Nov. Fedde 3: 337. 1907. Mansfield Island, Canada, *Geol. Surv.* 34782.

Puccinellia alaskana Scribn. and Merr., Contrib. U.S. Natl. Herb. 13: 78. 1910. St. Paul Island, Alaska, *Merriam.*

Puccinellia paupercula Fern. and Weath., Rhodora 18: 18. 1916. Based on *Glyceria paupercula* Holm.

Puccinellia paupercula var. *alaskana* Fern. and Weath., Rhodora 18: 18. 1916. Based on *P. alaskana* Scribn. and Merr.

This is the species referred by American authors to *Atropis angustata* Griseb., *Glyceria angustata* Vasey, and *Puccinellia angustata* Nash. The names are based on *Poa angustata* R. Br., a species of Arctic America.

(3) **Puccinellia rupestris** (With.) Fern. and Weath., Rhodora 18: 10. f. 17–22. 1916. Based on *Poa rupestris* With.

Poa rupestris With., Bot. Arr. Veg. Brit. ed. 3. 2: 146. 1796. England.
Poa procumbens Curtis, Fl. Lond. 6: pl. 11. 1798. England.
Sclerochloa procumbens Beauv., Ess. Agrost. 98. 1812. Based on *Poa procumbens* Curtis.
Festuca procumbens Kunth, Rév. Gram. 1: 129. 1829. Not *F. procumbens* Muhl., 1817. Based on *Poa procumbens* Curtis.
Scleropoa procumbens Parl., Fl. Ital. 1: 474. 1848. Based on *Poa procumbens* Curtis.
Atropis procumbens Thurb., in S. Wats., Bot. Calif. 2: 309. 1880. Based on *Poa procumbens* Curtis. [The specimen mentioned by Thurber (*Bolander* 6467) is *Poa unilateralis* Scribn., with a fragment of *Puccinellia rupestris*, which is not known to occur in California.] [29]
Panicularia procumbens Kuntze, Rev. Gen. Pl. 2: 782. 1891. Based on *Poa procumbens* Curtis.
(2) **Puccinellia simplex** Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 16: 1. f. 1. 1899. Woodland, Calif., *Blankinship*.

(17) REDFIELDIA Vasey

(1) **Redfieldia flexuosa** (Thurb.) Vasey, Bull. Torrey Bot. Club 14: 133. pl. 70. 1887. Based on *Graphephorum flexuosum* Thurb.
Graphephorum flexuosum Thurb.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 78. 1863. "Colorado Territory", latitude 41° [probably Nebraska], *Hall* and *Harbour* 635.

(127) REIMAROCHLOA Hitchc.

(1) **Reimarochloa oligostachya** Hitchc., Contrib. U.S. Natl. Herb. 12: 199. 1909. Based on *Reimaria obligostachya* Munro.
Reimaria oligostachya Munro; Benth., Jour. Linn. Soc. Bot. 19: 34. 1881. [Jacksonville], Fla., *Curtiss* 3566.

(149) RHAPHIS Lour.

(1) **Rhaphis pauciflorus** (Chapm.) Nash, in Small, Fl. Southeast. U.S. 67. 1903. Based on *Sorghum pauciflorum* Chapm.
Sorghum pauciflorum Chapm., Bot. Gaz. 3: 20. 1878. Jacksonville, Fla., *Chapman*.
Chrysopogon pauciflorus Benth.; Vasey, Grasses U.S. 20. 1883. Based on *Sorghum pauciflorum* Chapm.
Chrysopogon wrightii Munro; Vasey, Descr. Cat. Grasses U.S. 29. 1885. Based on *Sorghum pauciflorum* Chapm.
Andropogon pauciflorus Hack., in DC., Monogr. Phan. 6: 548. 1889. Based on *Sorghum pauciflorum* Chapm.

(153) ROTTBOELLIA L. f.

(1) **Rottboellia exaltata** L. f., Sup. Pl. 114. 1781. India.
Manisuris exaltata Kuntze, Rev. Gen. Pl. 2: 779. 1891. Based on *Rottboellia exaltata* L. f.
Stegosia exaltata Nash, N. Amer. Fl. 17: 84. 1909. Based on *Rottboellia exaltata* L. f.

(142) SACCHARUM L.

Saccharum ciliare Anderss., Öfv. Svensk. Vet. Akad. Förh. 12: 155. 1855. India.
(1) **Saccharum officinarum** L., Sp. Pl. 54. 1753. India.

(131) SACCIOLEPIS Nash

Sacciolepis indica (L.) Chase, Biol. Soc. Wash. Proc. 21: 8. 1908. Based on *Aira indica* L.
Aira spicata L., Sp. Pl. 63. 1753. India.

[29] See Hitchcock, in Jepson, W., Flora of California, pt. 1, p. 158. 1912.

Aira indica L., Sp. Pl. in Errata. 1753. Based on *Aira spicata* L. (p. 63). A change of name because of *Aira spicata* on page 64 of the same work. (See footnote 32, p. 975.)
Panicum indicum L., Mant. Pl. 2: 184. 1771. Not *P. indicum* Mill., 1768. Based on *Aira indica* L.
Hymenachne indica Buse, in Miquel, Pl. Jungh. 377. 1854. Based on *Panicum indicum* L.
Sacciolepis spicata Honda, Tokyo Univ. Jour. Faculty Sci., sec. 3. Bot. 3: 261. 1930. Based on *Aira spicata* L., Sp. Pl. 63.
Panicum spicatum Farwell, Rhodora 32: 262. 1930. Not *P. spicatum* Roxb., 1820. Based on *Aira spicata* L. Sp. Pl. 63.

(1) **Sacciolepis striata** (L.) Nash, Bull. Torrey Bot. Club 30: 383. 1903. Based on *Holcus striatus* L.
Holcus striatus L., Sp. Pl. 1048. 1753. Virginia, [*Clayton* 590].
Panicum striatum Lam., Tabl. Encycl. 1: 172. 1791. Carolina, *Fraser*.
Sorghum striatum Beauv., Ess. Agrost. 132, 165. 1812. Based on *Holcus striatus* L.
Panicum gibbum Ell., Bot. S.C. and Ga. 1: 116. 1816. Presumably South Carolina.
Panicum aquaticum Muhl., Descr. Gram. 126. 1817. Not *P. aquaticum* Poir., 1816. No locality cited.
Panicum fluitans Brickell; Muhl., Descr. Gram. 126. 1817, as synonym of *P. aquaticum* Muhl.
Panicum hydrophilum Schult., Mant. 2: 237. 1824. Based on *P. aquaticum* Muhl.
Panicum elliottianum Schult., Mant. 2: 256. 1824. Based on *P. gibbum* Ell.
Panicum aquaticum Bosc; Spreng., Syst. Veg. 1: 319. 1825. Not *P. aquaticum* Poir., 1816. Bermuda.
Hymenachne striata Griseb., Fl. Brit. W. Ind. 554. 1864. Based on *Panicum striatum* Lam.
Sacciolepis gibba Nash, in Britton, Man. 89. 1901. Based on *Panicum gibbum* Ell.

(97) SCHEDONNARDUS Steud.

(1) **Schedonnardus paniculatus** (Nutt.) Trel., in Branner and Coville, Rep. Geol. Survey Ark. 1888[4]: 236. 1891. Based on *Lepturus paniculatus* Nutt.
Lepturus paniculatus Nutt., Gen. Pl. 1: 81. 1818. Mandan, N.Dak.
Rottboellia paniculata Spreng., Syst. Veg. 1: 300. 1825. Based on *Lepturus paniculatus* Nutt.
Schedonnardus texanus Steud., Syn. Pl. Glum. 1: 146. 1854. Texas, *Drummond* 360.
Spirochloe paniculata Lunell, Amer. Midl. Nat. 4: 220. 1915. Based on *Lepturus paniculatus* Nutt.

(51) SCHISMUS Beauv.

(1) **Schismus barbatus** (L.) Chase, Contrib. U.S. Natl. Herb. 24: 182. 1925. Based on *Festuca barbata* L.
Festuca barbata L., Amoen. Acad. 3: 400. 1756. Spain.
Schismus fasciculatus Beauv., Ess. Agrost. 74, 177. 1812, name only; Trin., Fund. Agrost. 148. 1820. No locality cited.
Schismus marginatus Beauv., Ess. Agrost. 177. pl. 15. f. 4. 1812. No locality cited.

(29) SCHIZACHNE Hack.

(1) **Schizachne purpurascens** (Torr.) Swallen, Jour. Wash. Acad. Sci. 18: 204. f. 1. 1928. Based on *Trisetum purpurascens* Torr.
Avena striata Michx., Fl. Bor. Amer. 1: 73. 1803. Not *A. striata* Lam., 1783. Between Hudson Bay and Lake Mistassini, *Michaux*.
Trisetum purpurascens Torr., Fl. North. and Mid. U.S. 1: 127. 1823. Williamstown, Mass., *Dewey*; also Boston, Catskill Mountains, N.Y., and Montreal.
Avena callosa Turcz., in Ledeb., Fl. Ross. 4: 416. 1853. Siberia.
Avena striata forma *albicans* Fernald, Rhodora 7: 244. 1905. Mount Albert, Quebec, *Collins* and *Fernald* 26.

Melica striata Hitchc., Rhodora 8: 211. 1906. Based on *Avena striata* Michx.
Melica purpurascens Hitchc., Contrib. U.S. Natl. Herb. 12: 156. 1908. Based on *Trisetum purpurascens* Torr.
Schizachne fauriei Hack., Repert. Sp. Nov. Fedde 7: 323. 1909. Sachalin Island, *Faurie.*
Avena torreyi Nash, in Britt. and Brown, Illustr. Fl. ed. 2. 1: 219. 1913. Based on *Trisetum purpurascens* Torr., not *Avena purpurascens* DC., 1813.
Bromelica striata Farwell, Rhodora 21: 77. 1919. Based on *Avena striata* Michx.

(7) SCLEROCHLOA Beauv.

(1) **Sclerochloa dura** (L.) Beauv., Ess. Agrost. 98, 174, 177. pl. 19. f. 4. 1812. Based on *Poa dura* L. (error for Scop.).
Cynosurus durus L., Sp. Pl. 72. 1753. Southern Europe.
Poa dura Scop., Fl. Carn. ed. 2. 1: 70. 1772. Based on *Cynosurus durus* L.
Crassipes annuus Swallen, Amer. Jour. Bot. 18: 684. f. 1–4. 1931. Between Salt Lake City and Ogden, foot of Wasatch Mountains, Utah, *Fallas* in 1928.

(4) SCLEROPOA Griseb.

(1) **Scleropoa rigida** (L.) Griseb., Spic. Fl. Rum. 2: 431. 1844. Based on *Poa rigida* L.
Poa rigida L., Cent. Pl. 1: 5. 1755; Amoen. Acad. 4: 265. 1759. Europe.
Poa cristata Walt., Fl. Carol. 80. 1788. Not *P. cristata* L., 1767. South Carolina.
Sclerochloa rigida Link, Enum. Pl. 1: 90. 1821. Based on *Poa rigida* L.
Festuca rigida Raspail, Ann. Sci. Nat., Bot. 5: 445. 1825. Based on *Poa rigida* L.
Synaphe rigida Dulac, Fl. Haut. Pyr. 90. 1867. Based on *Scleropoa rigida* Griseb.
Diplachne rigida Munro; Chapm. Fl. South. U.S. ed. 3. 609. 1897. Based on *Poa rigida* L.

(38) SCLEROPOGON Phil.

(1) **Scleropogon brevifolius** Phil., An. Univ. Chile 36: 206. 1870. Mendoza, Argentina.
Festuca macrostachya Torr. and Gray, U.S. Rept. Expl. Miss. Pacif. 2^4:177. 1855. Name only. Pecos, Tex. [Staminate specimen.]
Tricuspis monstra Munro; Hemsl., Diag. Pl. Mex. 56. 1880, as synonym of *Scleropogon brevifolius* Phil.
Lesourdia karwinskyana Fourn., Bull. Soc. Bot. France 27: 102. pl. 4. f. 12. 1880. Mexico, *Karwinsky* 992.
Lesourdia multiflora Fourn., Bull. Soc. Bot. France 27: 102. pl. 3, 4. 1880. Tampico, Mexico, *Bernier.*
Scleropogon karwinskyanus Benth.; S. Wats., Amer. Acad. Sci. Proc. 18: 181. 1883. Based on *Lesourdia karwinskyana* Fourn.

(50) SCRIBNERIA Hack.

(1) **Scribneria bolanderi** (Thurb.) Hack., Bot. Gaz. 11: 105. pl. 5. 1886. Based on *Lepturus bolanderi* Thurb.
Lepturus bolanderi Thurb., Amer. Acad. Sci. Proc. 7: 401. 1868. Russian River Valley, Calif., *Bolander.*

(42) SECALE L.

(1) **Secale cereale** L., Sp. Pl. 84. 1753. Europe.
Triticum cereale Salisb., Prodr. Stirp. 27. 1796. Based on *Secale cereale* L.

(135) SETARIA Beauv.[30]

Setaria barbata (Lam.) Kunth, Rév. Gram. 1: 47. 1829. Based on *Panicum barbatum* Lam.
Panicum barbatum Lam., Tabl. Encycl. 1: 171. 1791. Mauritius.
Panicum costatum Roxb., Fl. Ind. ed. Carey 1: 314. 1820. Mauritius.
Panicum viaticum Salzm.; Doell, in Mart., Fl. Bras. 2^2: 155. 1877. Bahia, Brazil, *Salzmann* 706.

[30] For discussion of types see Hitchc., Contrib. U.S. Natl. Herb. 22: 156–208. 1920.

Chamaeraphis viatica Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum viaticum* Salzm.
Chamaeraphis costata Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Panicum costatum* Roxb.
Chaetochloa barbata Hitchc. and Chase, Contrib. U.S. Natl. Herb. 18: 348. 1917. Based on *Panicum barbatum* Lam.

(8) **Setaria corrugata** (Ell.) Schult., Mant. 2: 276. 1824. Based on *Panicum corrugatum* Ell.
Panicum corrugatum Ell., Bot. S.C. and Ga. 1: 113. 1816. Savannah, Ga., *Baldwin.*
Pennisetum corrugatum Nutt., Gen. Pl. 1: 55. 1818. Presumably based on *Panicum corrugatum* Ell.
Setaria glauca var. *corrugata* Schrad., Linnaea 12: 429. 1838. Based on *S. corrugata* Schult.
Chamaeraphis corrugata Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum corrugatum* Ell.
Chaetochloa corrugata Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum corrugatum* Ell.
Chaetochloa hispida Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 25. f. 13. 1900. Cuba, *Wright.*
Setaria hispida Schum., Just's Bot. Jahresber. 28[1]: 417. 1902. Based on *Chaetochloa hispida* Scribn. and Merr.

(2) **Setaria geniculata** (Lam.) Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum geniculatum* Lam.
Panicum geniculatum Lam., Encycl. 4: 727 (err. typ. 737). 1798. Guadeloupe.
Cenchrus parviflorus Poir., in Lam., Encycl. 6: 52. 1804. Puerto Rico.
Setaria gracilis H.B.K., Nov. Gen. and Sp. 1: 109. 1815. Colombia, *Humboldt* and *Bonpland.*
Setaria purpurascens H.B.K., Nov. Gen. and Sp. 1: 110. 1815. Ecuador, *Humboldt* and *Bonpland.*
Pennisetum geniculatum Jacq., Eclog. Gram. 3: pl. 26. 1815–1820. Based on *Panicum geniculatum* Lam.
Panicum imberbe Poir., in Lam., Encycl. Sup. 4: 272. 1816. North America and Brazil.
Panicum laevigatum Muhl.; Ell., Bot. S.C. and Ga. 1: 112. 1816. Not *P. laevigatum* Lam. 1778. Eddings Island, S.C. (Published as new in Muhl., Descr. Gram. 100. 1817 for the same species.)
Panicum glaucum var. *purpurascens* Ell., Bot. S.C. and Ga. 1: 113. 1816. Muhl., Paris Island and Charleston Neck, S.C.
Panicum medium Muhl.; Ell., Bot. S.C. and Ga. 1: 113. 1816, as synonym of *P. glaucum* var. *purpurascens* Ell.
Setaria imberbis Roem. and Schult., Syst. Veg. 2: 891. 1817. Based on *Panicum imberbe* Poir.
Pennisetum laevigatum Nutt., Gen. Pl. 1: 55. 1818. Presumably based on *Panicum laevigatum* Muhl.
Setaria laevigata Schult., Mant. 2: 275. 1824. Based on *Panicum laevigatum* Muhl.
Setaria affinis Schult., Mant. 2: 276. 1824. Based on Muhlenberg's *Panicum* no. 4. Georgia and Pennsylvania.
Setaria berteroniana Schult., Mant. 2: 276. 1824. Dominican Republic, *Bertero.*
Setaria glauca var. *purpurascens* Torr., Fl. North. and Mid. U.S. 153. 1824. Based on *Setaria purpurascens* H.B.K. Published as new by Urban (Symb. Antill. 4: 96. 1903) based on the same type.
Panicum flavum Nees, Agrost. Bras. 238. 1829. Brazil.
Panicum dasyurum Nees, Agrost. Bras. 241. 1829. Brazil, *Hoffmansegg*; Montevideo, *Sellow.*
Panicum fuscescens Willd.; Nees, Agrost. Bras. 241. 1829, as synonym of *P. purpurascens* H.B.K. [South America, *Humboldt*].
Panicum penicillatum Willd.; Nees, Agrost. Bras. 242. 1829. Not *P. penicillatum* Nees; Trin. 1826. Brazil.
Panicum tejucense Nees, Agrost. Bras. 243. 1829. Tejuco, Brazil.
Setaria flava Kunth, Rév. Gram. 1: 46. 1829. Based on *Panicum flavum* Nees.
Setaria ventenatii Kunth, Rév. Gram. 1: 251. pl. 37. 1830. Puerto Rico.
Setaria tejucensis Kunth, Rév. Gram. 1: Sup. XI. 1830. Based on *Panicum tejucense* Nees.

Setaria penicillata Presl, Rel. Haenk. 1: 314. 1830. Based on *Panicum penicillatum* Willd.
Panicum ventenatii Steud., Nom. Bot. ed. 2. 2: 265. 1841. Based on *Setaria ventenatii* Kunth.
Panicum berteronianum Steud., Syn. Pl. Glum. 1: 50. 1854. Based on *Setaria berteroniana* Schult.
Setaria glauca var. *laevigata* Chapm., Fl. South. U.S. 578. 1860. Based on *Panicum laevigatum* Muhl.
Setaria stipaeculmis C. Muell., Bot. Ztg. 19: 323. 1861. Rio Brazos, Tex., *Drummond.*
Setaria glauca var. *penicillata* Griseb., Fl. Brit. W.Ind. 554. 1864. Based on *Panicum penicillatum* Willd.
Setaria glauca var. *imberbis* Griseb., Fl. Brit. W.Ind. 554. 1864. Based on *Panicum imberbe* Poir.
Panicum imberbe var. *dasyurum* Doell, in Mart., Fl. Bras. 2^3: 157. 1877. Based on *P. dasyurum* Nees.
Panicum imberbe var. *purpurascens* Doell, in Mart., Fl. Bras. 2^3: 157. 1877. Based on *P. purpurascens* H.B.K.
Setaria streptobotrys Fourn., Mex. Pl. 2: 47. 1886. Mexico, *Galeotti* 5832, *Liebmann* 358, and several other collections cited.
Chamaeraphis glauca var. *imberbis* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum imberbe* Poir.
Chamaeraphis glauca var. *penicillata* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum penicillatum* Willd.
Chamaeraphis glauca var. *geniculata* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum geniculatum* Lam.
Setaria perennis Hall; Smyth, Check List Pl. Kans. 26. 1892. [Hutchinson], Kans., *Smyth.*
Setaria gracilis var. *dasyura* Arech., An. Mus. Nac. Montevideo 1: 165. 1894. Based on *Panicum dasyurum* Nees.
Chamaeraphis ventenatii Beal, Grasses N.Amer. 2: 153. 1896. Based on *Setaria ventenatii* Kunth.
Chamaeraphis glauca var. *laevigata* Beal, Grasses N.Amer. 2: 155. 1896. Based on *Panicum laevigatum* Muhl.
Chamaeraphis glauca var. *perennis* Beal, Grasses N.Amer. 2: 156. 1896. Florida, *Curtiss* 3614.*
Chaetochloa imberbis Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum imberbe* Poir.
Chaetochloa penicillata Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum penicillatum* Willd.
Chaetochloa flava Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum flavum* Nees.
Chaetochloa versicolor Bicknell, Bull. Torrey Bot. Club. 25: 105. pl. 329. 1898. New York City, *Bicknell.*
Chaetochloa perennis Bicknell, Bull. Torrey Bot. Club 25: 107. 1898. Based on *C. glauca* var. *perennis* Beal.
Chaetochloa laevigata Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 21: 10. 1900. Based on *Panicum laevigatum* Muhl.
Chaetochloa imberbis penicillata Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 11. f. 2. 1900. Based on *Panicum penicillatum* Willd.
Chaetochloa imberbis perennis Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 12. 1900. Based on *Setaria perennis* Hall.
Chaetochloa imberbis geniculata Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 12. 1900. Based on *Panicum geniculatum* Lam.
Chaetochloa imberbis streptobotrys Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 13. 1900. Based on *Setaria streptobotrys* Fourn.
Chaetochloa purpurascens Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 13. 1900. Based on *Setaria purpurascens* H.B.K.
Chaetochloa gracilis Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 15. 1900. Based on *Setaria gracilis* H.B.K.
Chaetochloa corrugata parviflora Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 24. 1900. Based on *Cenchrus parviflorus* Poir.
Ixophorus glaucus-laevigata Chapm., Gattinger, Tenn. Fl. 38. 1901. Presumably based on *Setaria glauca* var. *laevigata* Chapm.
Panicum glaberrimum Ell.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 29: 3. 1901. Not *P. glaberrimum* Steud., 1854. As synonym of *Chaetochloa imberbis* Scribn.

Chaetochloa ventenatii Nash, in Kearney, Contrib. U.S. Natl. Herb. 5: 515. 1901. Based on *Setaria ventenatii* Kunth.
Chaetochloa occidentalis Nash, in Britton, Man. 90. 1901. Kansas [type, Hutchinson, *Smyth*] and Oklahoma.
Panicum imberbe var. *gracile* Kneucker, Allg. Bot. Ztschr. 8: 13. 1902. Based on *Setaria gracilis* H.B.K.
Setaria glauca var. *geniculata* Urban, Symb. Antill. 4: 96. 1903. Based on *Panicum geniculatum* Lam.
Setaria glauca var. *purpurascens* Urban, Symb. Antill. 4: 96. 1903. Based on *S. purpurascens* H.B.K.
Chaetochloa geniculata Millsp. and Chase, Field Mus. Bot. 3: 37. 1903. Based on *Panicum geniculatum* Lam.
Chamaeraphis imberbis Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Based on *Panicum imberbe* Poir.
Chamaeraphis gracilis Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Not *C. gracilis* Hack., 1885. Based on *Setaria gracilis* H.B.K.
Chamaeraphis penicillata Presl; Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Based on *Setaria penicillata* Presl.
Setaria imberbis var. *perennis* Hitchc., Rhodora 8: 210. 1906. Based on *S. perennis* Hall.
Setaria imberbis var. *purpurascens* Hack., in Stuck., An. Mus. Nac. Buenos Aires 13: 442. 1906. Based on *S. purpurascens* H.B.K.
Chaetochloa imberbis versicolor Stone, N.J. Mus. Ann. Rept. 1910: 213. 1911. Based on *C. versicolor* Bicknell.
Panicum versicolor Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Not *P. versicolor* Doell, 1877. Based on *Chaetochloa versicolor* Bicknell.
Panicum occidentale Nieuwl., Amer. Midl. Nat. 2: 64. 1911. Not *P. occidentale* Scribn., 1899. Based on *Chaetochloa occidentalis* Nash.
Chaetochloa geniculata var. *perennis* House, N.Y. State Mus. Bull. 254: 85. 1924. Based on *Setaria perennis* Hall.
Chaetochloa viridis var. *purpurascens* Honda, Bot. Mag. Tokyo 38: 197. 1924. Based on *Setaria purpurascens* H.B.K.
Panicum lutescens var. *flavum* Backer, Handb. Fl. Java 2: 142. 1928. Based on *P. flavum* Nees.

(10) **Setaria grisebachii** Fourn., Mex. Pl. 2: 45. 1886. Orizaba, Mexico, [*Schaffner* 36].
Setaria laevis Fourn., Mex. Pl. 2: 45. 1886. Bernal, Mexico, *Karwinsky* 961.
Chaetochloa grisebachii Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Setaria grisebachii* Fourn.
Chaetochloa grisebachii ampla Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 36. f. 21. 1900. Federal District, Mexico, *Pringle* 4670 [error for 6470].
Chaetochloa grisebachii mexicana Scribn. and Merr., U.S.Dept. Agr., Div. Agrost. Bull. 21: 37. 1900. San Luis Potosí, Mexico, *Schaffner* 1044.
Setaria mexicana Schaffn.; Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 37. 1900, as synonym of *Chaetochloa grisebachii mexicana* Scribn. and Merr.

(13) **Setaria italica** (L.) Beauv., Ess. Agrost. 51, 170, 178. 1812. Based on *Panicum italicum* L.
Panicum italicum L., Sp. Pl. 56. 1753. India.
Panicum germanicum Mill., Gard. Dict. ed. 8. *Panicum* no. 1. 1768. Europe.
Panicum italicum var. *germanicum* Koel., Descr. Gram. 17. 1802. Europe.
Pennisetum italicum R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810. Based on *Panicum italicum* L.
Setaria germanica Beauv., Ess. Agrost. 51, 169, 178. 1812. Based on *Panicum germanicum* Willd. (same as Mill. 1768).
Pennisetum germanicum Baumg., Enum. Stirp. Transsilv. 3: 277. 1816. Based on *Setaria germanica* Beauv.
Setaria italica var. *germanica* Schrad., Linnaea 12: 430. 1838. Based on *Panicum germanicum* Roth (same as Mill. 1768).
Setaria californica Kellogg, Calif. Acad. Sci. Proc. 1 (ed. 2): 26. 1873. Shasta, Calif., *Dash.*
Panicum italicum var. *californicum* Koern. and Wern., Handb. Getreidebau 1: 272, 273. 1885. California.
Chamaeraphis italica Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum italicum* L.

Chamaeraphis italica var. *germanica* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum germanicum* L. (error for Mill.).
Ixophorus italicus Nash, Bull. Torrey Bot. Club 22: 423. 1895. Based on *Panicum italicum* L.
Chaetochloa italica Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum italicum* L.
Chaetochloa italica germanica Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 6: 32. 1897. Based on *Panicum germanicum* Mill.
Chaetochloa germanica Smyth, Trans. Kans. Acad. 25: 89. 1913. Based on *Panicum germanicum* Mill.
Setaria italica subsp. *stramineofructa* subvar. *germanica* F. T. Hubb., Amer. Jour. Bot. 2: 189. 1915. Based on *Panicum germanicum* Mill.
Setaria italica subsp. *stramineofructa* var. *brunneoseta* subvar. *densior* F. T. Hubb., Amer. Jour. Bot. 2: 192. 1915. Weston, Mass., *Williams* in 1895.

(9) **Setaria liebmanni** Fourn., Mex. Pl. 2: 44. 1886. Mexico, *Liebmann* 389.
Setaria rariflora Presl, Rel. Haenk. 1: 313. 1830. Not *S. rariflora* Mikan, 1821. Acapulco, Mexico, *Haenke.*
Panicum rariflorum Presl; Steud., Syn. Pl. Glum. 1:51. 1854. Not *P. rariflorum* Lam., 1798. Based on *Setaria rariflora* Presl.
Chamaeraphis caudata var. *pauciflora* Vasey; Beal, Grasses N.Amer. 2: 158. 1896. [Baja] California [type, Guaymas, Mexico], *Palmer* 191.
Chaetochloa liebmanni Scribn. and Merr., U.S.Dept. Agr., Div. Agrost. Bull. 21: 31. 1900. Based on *Setaria liebmanni* Fourn.
Chaetochloa liebmanni pauciflora Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 33. 1900. Based on *Chamaeraphis caudata* var. *pauciflora* Vasey.

(1) **Setaria lutescens** (Weigel) F. T. Hubb., Rhodora 18: 232. 1916. Based on *Panicum lutescens* Weigel.
Panicum lutescens Weigel, Obs. Bot. 20. 1772. Germany.
Panicum glaucum var. *elongatum* Pers., Syn. Pl. 1: 81. 1805. America.
Panicum glaucum var. *flavescens* Ell., Bot. S.C. and Ga. 1: 113. 1816. Presumably South Carolina.
Panicum glaucum var. *laevigatum* LeConte; Torr., in Eaton, Man. Bot. ed. 2. 339. 1818. Northern and Middle States.
Setaria glauca var. *elongata* Raddi, Agrost. Bras. 49. 1823. Based on *Panicum glaucum* var. *elongatum* Pers.
Panicum compressum Balb.; Steud., Nom. Bot. ed. 2. 2: 254. 1841, erroneously cited as synonym of *P. glaucum* R. Br. [Dominican Republic, *Bertero.*]
Chaetochloa lutescens Stuntz, U.S. Dept.Agr., Bur. Plant Indus. Inventory Seeds 31: 36, 86. 1914. Based on *Panicum lutescens* Weigel.

Panicum glaucum L. has been shown to apply to pearl millet (see *Pennisetum glaucum*, p. 924). The name at an early date came to be used for the species here called *Setaria lutescens.* The following names have been misapplied to this species:

Panicum glaucum L., Sp. Pl. 56. 1753.
Setaria glauca Beauv., Ess. Agrost. 51, 178. 1812.
Chamaeraphis glauca Kuntze, Rev. Gen. Pl. 2: 767. 1891.
Ixophorus glaucus Nash, Bull. Torrey Bot. Club 22: 423. 1895.
Chaetochloa glauca Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897.

(4) **Setaria macrosperma** (Scribn. and Merr.) Schum., Just's Bot. Jahresber. 28[1]: 417. 1902. Based on *Chaetochloa macrosperma* Scribn. and Merr.
Chaetochloa macrosperma Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 33. f. 18. 1900. St. Johns River, Fla., *Curtiss* 3617.

(6) **Setaria macrostachya** H.B.K., Nov. Gen. and Sp. 1: 110. 1815. [Guanajuato], Mexico, *Humboldt* and *Bonpland.*
Panicum macrostachyum Nees, Agrost. Bras. 245. 1829. Based on *Setaria macrostachya* H.B.K.
Chamaeraphis setosa var. *macrostachya* Kuntze, Rev. Gen. Pl. 2: 769. 1891. Based on *Setaria macrostachya* H.B.K.
Chaetochloa gibbosa Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 24. 1900. Mexico [probably Tamaulipas] *Berlandier* 528.
Chaetochloa leucopila Scribn. and Merr., U.S.Dept. Agr., Div. Agrost. Bull. 21: 26. f. 14. 1900. Parras, Coahuila, *Palmer* 1363 in 1880.
Chaetochloa macrostachya Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 29. f. 16. 1900. Based on *Setaria macrostachya* H.B.K.
Chaetochloa rigida Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 30. 1900. La Paz, Baja California, *Palmer* 125 in 1890.

Setaria leucopila Schum., Just's Bot. Jahresber. 28[1]: 417. 1902. Based on *Chaetochloa leucopila* Scribn. and Merr.

Setaria gibbosa Schum., in Just's Bot. Jahresber. 28[1]: 417. 1902. Based on *Chaetochloa gibbosa* Scribn. and Merr.

Setaria rigida Schum., in Just's Bot. Jahresber. 28[1]: 417. 1902. Not *S. rigida* Stapf, 1899. Based on *Chaetochloa rigida* Scribn. and Merr.

Chamaeraphis macrostachya Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 76. 1904. Based on *Setaria macrostachya* H.B.K.

Setaria commutata Hack.; Stuck., An. Hist. Nat. Buenos Aires 13: 439. 1906. Based on *Chaetochloa composita* as described and figured by Scribner and Merrill (U.S.Dept.Agr., Div. Agrost. Bull. 21: 27 f. 15. 1900), not *Setaria composita* H.B.K. on which the name *Chaetochloa composita* Scribn. is based. The name is published as "*Setaria commutata* (Scribn.) Hack."

(11) **Setaria magna** Griseb., Fl. Brit. W. Ind. 554. 1864. Jamaica, *Purdie.*

Chamaeraphis magna Beal, Grasses N.Amer. 2: 152. 1896. Based on *Setaria magna* Griseb.

Chaetochloa magna Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Setaria magna* Griseb.

Setaria nigrirostris (Nees) Dur. and Schinz, Consp. Fl. Afr. 5: 774. 1894. Based on *Panicum nigrirostris* Nees.

Panicum nigrirostris Nees, Fl. Afr. Austr. 55. 1841. South Africa.

Chaetochloa nigrirostris Skeels, U.S.Dept.Agr., Bur. Plant Indus. Bull. 207: 22. 1911. Based on *Panicum nigrirostris* Nees.

Setaria palmifolia (Willd.) Stapf, Jour. Linn. Soc. Bot. 42: 186. 1914. Based on *Panicum palmifolium* Koen. (Naturforscher 23: 208. 1788, same as *P. palmifolium* Willd., but inadequately published.)

Panicum plicatum Willd., Enum. Pl. 1033. 1809. Asia. Not *P. plicatum* Lam., 1791.

Panicum palmifolium Willd.; Poir., in Lam., Encycl. Sup. 4: 282. 1816. Based on *P. plicatum* Willd.

Chamaeraphis palmifolia Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Panicum palmifolium* Willd.

Chaetochloa palmifolia Hitchc. and Chase, Contrib. U.S. Natl. Herb. 18: 348. 1917. Based on *Panicum palmifolium* Willd.

Setaria poiretiana (Schult.) Kunth, Rév. Gram. 1: 47. 1829. Based on *Panicum poiretianum* Schult.

Panicum elongatum Poir., in Lam., Encycl. Sup. 4: 278. 1816. Not *P. elongatum* Salisb., 1796, nor Pursh, 1814. Brazil.

Panicum poiretianum Schult., Mant. 2: 229. 1824. Based on *P. elongatum* Poir.

Chaetochloa poiretiana Hitchc., Contrib. U.S. Natl. Herb. 22: 159. 1920. Based on *Panicum poiretianum* Schult.

Setaria rariflora Mikan; Trin., in Spreng., Neu. Entd. 2: 78. 1821. Brazil.

Chaetochloa rariflora Hitchc. and Chase, Contrib. U.S. Natl. Herb. 18: 349. 1917. Based on *Setaria rariflora* Mikan.

Panicum rariflorum Makino and Nemoto, Fl. Jap. 1475. 1925. Not *P. rariflora* Lam., 1798. Based on *Setaria rariflora* Mikan.

(7) **Setaria scheelei** (Steud.) Hitchc., Biol. Soc. Wash. Proc. 41: 163. 1928. Based on *Panicum scheelei* Steud.

Setaria polystachya Scheele, Linnaea 22: 339. 1849. Not *S. polystachya* Schrad., 1824. New Braunfels, Tex., *Lindheimer* 564.

Panicum scheelei Steud., Syn. Pl. Glum. 1: 51. 1854. Based on *Setaria polystachya* Scheele.

Chaetochloa polystachya Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 37. f. 22. 1900. Based on *Setaria polystachya* Scheele.

Chaetochloa scheelei Hitchc., Contrib. U.S. Natl. Herb. 12: 207. f. 62. 1920. Based on *Panicum scheelei* Steud.

Setaria setosa (Swartz) Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum setosum* Swartz.

Panicum setosum Swartz, Prodr. Veg. Ind. Occ. 22. 1788. Jamaica, *Swartz.*

Panicum caudatum Lam., Tabl. Encycl. 1: 171. 1791. Brazil.

Setaria caudata Roem. and Schult., Syst. Veg. 2: 495. 1817. Based on *Panicum caudatum* Lam.

Setaria setosa var. *caudata* Griseb., Fl. Brit. W.Ind. 555. 1864. Based on *Setaria caudata* Roem. and Schult.

Pennisetum swartzii F. Muell., Fragm. Phyt. Austr. 8: 110. 1873. Based on *Panicum setosum* Swartz.
Chamaeraphis setosa Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum setosum* Swartz.
Chamaeraphis caudata Britton, Ann. N.Y. Acad. Sci. 7: 264. 1893. Based on *Panicum caudatum* Lam.
Chaetochloa setosa Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum setosum* Swartz.
Chaetochloa caudata Scribn., Mo. Bot. Gard. Rept. 10: 52. 1899. Based on *Panicum caudatum* Lam.

(3) **Setaria verticillata** (L.) Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum verticillatum* L.
Panicum verticillatum L., Sp. Pl. ed. 2. 1: 82. 1762. Europe.
Pennisetum verticillatum R. Br., Prodr. Fl. Nov. Holl. 195. 1810. Based on *Panicum verticillatum* L.
Chamaeraphis italica var. *verticillata* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum verticillatum* L.
Chamaeraphis verticillata Porter, Bull. Torrey Bot. Club 20: 196. 1893. Based on *Panicum verticillatum* L.
Ixophorus verticillatus Nash, Bull. Torrey Bot. Club 22: 422. 1895. Based on *Panicum verticillatum* L.
Chaetochloa verticillata Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum verticillatum* L.
Chaetochloa brevispica Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 15. f. 5. 1900. Published as a new name for *Panicum verticillatum* var. *parviflorum* Doell, the identity of which is uncertain. The plants described and figured by Scribner and Merrill are *S. verticillata*.
Setaria brevispica Schum., in Just's Bot. Jahresber. 28[1]: 417. 1902. Based on *Chaetochloa brevispica* Scribn. and Merr.
Chaetochloa verticillata var. *brevisceta* (Godr.) Farwell, Mich. Acad. Sci. Papers 1: 86. 1921, is based on a European type I have not examined.
SETARIA VERTICILLATA var. AMBIGUA Parl., Fl. Palerm. 1: 36. 1845. Based on *Panicum verticillatum* var. *ambiguum* Guss.
Panicum verticillatum var. *ambiguum* Guss., Fl. Sic. Prodr. 80. 1827. Sicily.
Setaria ambigua Guss., Fl. Sic. Syn. 1: 114. 1842. Not *S. ambigua* Merat, 1836. Based on *Panicum verticillatum* var. *ambiguum* Guss.
Setaria viridis var. *ambigua* Coss. and Dur., Expl. Sci. Alger. 2: 36. 1867. Based on *S. ambigua* Guss.
Panicum ambiguum Hausskn., Oesterr. Bot. Ztschr. 25: 345. 1875. Based on *Setaria ambigua* Guss.
Chamaeraphis italica var. *ambigua* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Setaria ambigua* Guss.
Chaetochloa ambigua Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Bull. 21: 18. f. 7. 1900. Based on *Setaria verticillata* var. *ambigua* Guss.

(5) **Setaria villosissima** (Scribn. and Merr.) Schum., Just's Bot. Jahresber. 28[1]: 417. 1902. Based on *Chaetochloa villosissima* Scribn. and Merr.,
Chaetochloa villosissima Scribn. and Merr. U.S.Dept.Agr., Div. Agrost. Bull. 21: 34. f. 19. 1900. San Diego, Tex., *J. G. Smith* in 1897.

(12) **Setaria viridis** (L.) Beauv., Ess. Agrost. 51, 178. 1812. Based on *Panicum viride* L.
Panicum viride L., Syst. Nat. ed. 10. 2: 870. 1759. Europe.
Pennisetum viride R. Br., Prodr. Fl. Nov. Holl. 1: 195. 1810. Based on *Panicum viride* L.
Setaria weinmanni Roem. and Schult., Syst. Veg. 2: 490. 1817. Europe.
Panicum viride var. *brevisetum* Doell, Rhein. Fl. 128. 1843. Europe.
Setaria viridis var. *weinmanni* Borbás, Math. Termesz. Közlem. 15: 310. 1878. Based on *Setaria weinmanni* Roem. and Schult.
Panicum italicum var. *viride* Koern., in Koern. and Wern., Handb. Getreidebau. 1: 277. 1885. Based on *Panicum viride* L.
Setaria viridis var. *purpurascens* Peck; Dudley, Cornell Univ. Bull. 2: 122. 1886. Not *S. viridis* var. *purpurascens* Peterm., 1838. New York, *Peck*.
Chamaeraphis italica var. *viridis* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum viride* L.
Chamaeraphis viridis Millsp., W.Va. Agr. Expt. Sta. Bull. 2: 466. 1892. Based on *Panicum viride* L.
Ixophorus viridis Nash, Bull. Torrey Bot. Club 22: 423. 1895. Based on *Panicum viride* L.

Chaetochloa viridis Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 39. 1897 Based on *Panicum viride* L.

Setaria viridis var. *breviseta* Hitchc., Rhodora 8: 210. 1906. Based on *Panicum viride* var. *brevisetum* Doell.

Setaria italica subsp. *viridis* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 85. 1912. Based on *Panicum viride* L.

Chaetochloa viridis var. *breviseta* Farwell, Mich. Acad. Sci. Papers 1: 86. 1921. Based on *Panicum viride* var. *brevisetum* Doell.

Chaetochloa viridis var. *weinmanni* House, N.Y. State Mus. Bull. 243–244: 39. 1923. Based on *Setaria weinmanni* Roem. and Schult.

Chaetochloa viridis var. *major* (Gaudin) Farwell, Mich. Acad. Sci. Papers 1: 86. 1921, and *C. viridis* var. *minor* (Koch) Farwell (l.c.) are based on European types I have not examined.

(44) SITANION Raf.

(1) **Sitanion hanseni** (Scribn.) J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 20. 1899. Based on *Elymus hanseni* Scribn.

Elymus hanseni Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 56. f. 12. 1898. Amador County, Calif., *Hansen* 1742.

Sitanion planifolium J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 19. 1899. Skamania County, Wash., *Suksdorf* 224.

Sitanion anomalum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 20. pl. 4. 1899. Pasadena, Calif., *Allen* in 1885.

Sitanion leckenbyi Piper, Erythea 7: 100. 1899. Wawawai, Wash., *Piper* 3003.

Sitanion rubescens Piper, Bull. Torrey Bot. Club. 30: 234. 1903. Mount Rainier, Wash., *Piper* 1954.

Elymus leckenbyi Piper, Contrib. U.S. Natl. Herb. 11: 151. 1906. Based on *Sitanion leckenbyi* Piper.

Sitanion hanseni anomalum Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *S. anomalum* J. G. Smith.

(3) **Sitanion hystrix** (Nutt.) J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 15. pl. 2. 1899. Based on *Aegilops hystrix* Nutt.

Aegilops hystrix Nutt., Gen. Pl. 1: 86. 1818. Plains of the Missouri.

Sitanion elymoides Raf., Jour. Phys. Chym. 89: 103. 1819. Missouri [River].

Elymus sitanion Schult., Mant. 2: 426. 1824. Based on *Sitanion elymoides* Raf.

Polyanthrix hystrix Nees, Ann. Nat. Hist. 1: 284. 1838. Based on *Aegilops hystrix* Nutt., but misapplied to *S. jubatum*.

Elymus elymoides Swezey, Nebr. Pl. Doane Coll. 15. 1891. Based on *Sitanion elymoides* Raf.

Sitanion minus J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 12. 1899. Jacumba Hot Springs, Calif., *Schoenefeldt* 3277.

Sitanion rigidum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 13. 1899. Cascade Mountains, Wash., *Allen* 178.

Sitanion californicum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 13. 1899. San Bernardino Mountains, Calif., *Parish* 3295.

Sitanion glabrum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 14. 1899. Coso Mountains, Calif., *Coville* and *Funston* 914.

Sitanion cinereum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 14. 1899. Reno, Nev., *Tracy* 222.

Sitanion insulare J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 14. 1899. Carrington Island, Salt Lake, Utah, *Watson* 1338.

Chretomeris trichoides Nutt.; J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 15. 1899, as synonym of *Sitanion hystrix*.

Elymus difformis Nutt.; J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 15. 1899, as synonym of *Sitanion hystrix*.

Sitanion montanum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 16. 1899. Spanish Creek, Mont., *Rydberg* 3091.

Sitanion caespitosum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 16. 1899. Cliff, N.Mex., *J. G. Smith* in 1897.

Sitanion strigosum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 17. 1899. Sheep Creek, Mont., *Rydberg* 3298.

Sitanion molle J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 17. 1899. Larimer County, Colo., *Shear* and *Bessey* 1469.

Sitanion brevifolium J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 17. 1899. Tucson, Ariz., *Toumey* 797.

Sitanion longifolium J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 18. 1899. Silverton, Colo., *Shear* 1213.
Sitanion pubiflorum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 19. 1899. Tucson, Ariz., *Toumey* 795.
Sitanion latifolium Piper, Erythea 7: 99. 1899. Blue Mountains, Walla Walla County, Wash., *Piper* in 1896.
Sitanion marginatum Scribn. and Merr., Bull. Torrey Bot. Club 29: 469. 1902. Leigh Lake, Teton Mountains, Wyo., *Merrill* and *Wilcox* 334.
Elymus glaber Davy, Univ. Calif. Pubs., Bot. 1: 57. 1902. Based on *Sitanion glabrum* J. G. Smith.
Elymus pubiflorus Davy, Univ. Calif. Pubs., Bot. 1: 58. 1902. Based on *Sitanion pubiflorum* J. G. Smith.
Sitanion velutinum Piper, Bull. Torrey Bot. Club 30: 233. 1903. Steptoe, Wash., *G. R. Vasey* in 1901.
Sitanion basalticola Piper, Bull. Torrey Bot. Club 30: 234. 1903. Coulee City, Wash., *Piper* 3924.
Sitanion albescens Elmer, Bot. Gaz. 36: 57. 1903. Ellensburg, Wash., *Whited* 670.
Sitanion ciliatum Elmer, Bot. Gaz. 36: 58. 1903. Wenatchee, Wash., *Whited* in 1901.
Hordeum elymoides Schenck, Bot. Jahrb. Engler 40: 109. 1907. Based on *Sitanion elymoides* Raf.
Elymus brevifolius Jones, Contrib. West. Bot. 14: 20. 1912. Based on *Sitanion brevifolium* J. G. Smith.
Elymus hystrix Jones, Contrib. West. Bot. 14: 20. 1912. Not *E. hystrix* L. Based on *Aegilops hystrix* Nutt.
Elymus insularis Jones, Contrib. West. Bot. 14: 20. 1912. Based on *Sitanion insulare* J. G. Smith.
Elymus minor Jones, Contrib. West. Bot. 14: 20. 1912. Based on *Sitanion minus* J. G. Smith.
Sitanion rigidum var. *californicum* Smiley, Univ. Calif. Pubs., Bot. 9: 99. 1921. Based on *S. californicum* J. G. Smith.
Sitanion hordeoides Suksdorf, Werdenda 1^2: 4. 1923. Spangle, Wash., *Suksdorf* 8705.

(2) **Sitanion jubatum** J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 10. 1899. Waitsburg, Wash., *Horner* 573.
Elymus sitanion jubatum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 10. 1899, as synonym of *S. jubatum.*
Sitanion villosum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 11. pl. 1. 1899. Almota, Wash., *Elmer* 266.
Sitanion multisetum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 11. 1899. Tehachapi Valley, Calif., *Coville* and *Funston* 1121.
Sitanion polyanthrix J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 12. 1899. California, *Douglas.* New name given to the species described by Nees under *Polyanthrix hystrix*, that name being based on *Aegilops hystrix* Nutt.
Sitanion breviaristatum J. G. Smith, U.S.Dept.Agr., Div. Agrost. Bull. 18: 12. 1899. Panamint Mountains, Calif., *Coville* and *Funston* 833.
Sitanion strictum Elmer, Bot. Gaz. 36: 59. 1903. Parker, Wash., *Elmer* in 1898.
Elymus multisetus Jones, Contrib. West. Bot. 14: 20. 1912. Based on *Sitanion multisetum* J. G. Smith.

(148) SORGHASTRUM Nash

(2) **Sorghastrum elliottii** (Mohr) Nash, N.Amer. Fl. 17: 130. 1912. Based on *Chrysopogon elliottii* Mohr.
Chrysopogon elliottii Mohr, Bull. Torrey Bot. Club. 24: 21. 1897. Based on *Andropogon nutans* as described by Elliott, not *A. nutans* L.

(1) **Sorghastrum nutans** (L.) Nash, in Small, Fl. Southeast. U.S. 66. 1903. Based on *Andropogon nutans* L.
Andropogon nutans L., Sp. Pl. 1045. 1753. "Virginia, Jamaica." [Type eastern America, *Kalm* [31]; cited localities erroneous.]
?*Stipa villosa* Walt., Fl. Carol. 78. 1788. South Carolina.
?*Stipa stricta* Lam., Tabl. Encycl. 1: 158. 1791; Encycl. 7: 453. 1806. South Carolina, *Fraser.*

[31] For discussion see Hitchcock, A. S. Contrib. U.S. Natl. Herb. 12: 125. 1908.

Andropogon avenaceus Michx., Fl. Bor. Amer. 1: 58. 1803. Illinois, *Michaux.*
Andropogon ciliatus Ell., Bot. S.C. and Ga. 1: 144. 1816. Port Royal, S.C.
Sorghum nutans A. Gray, Man. 617. 1848. Based on *Andropogon nutans* L.
Sorghum avenaceum Chapm., Fl. South. U.S. 583. 1860. Based on *Andropogon avenaceus* Michx.
Chrysopogon nutans Benth., Jour. Linn. Soc. Bot. 19: 73. 1881. Based on *Andropogon nutans* L.
Chrysopogon avenaceus Benth., Jour. Linn. Soc. Bot. 19: 73. 1881. Based on *Andropogon avenaceus* Michx.
Sorghum nutans subsp. *avenaceum* Hack., in Mart., Fl. Bras. 2^3: 274. 1883. Based on *Andropogon avenaceus* Michx.
Sorghum nutans subsp. *linnaeanum* Hack., in Mart., Fl. Bras. 2^3: 276. 1883. Based on *Andropogon nutans* L.
Andropogon albescens Fourn., Mex. Pl. 2: 56. 1886. Vera Cruz, Mexico, *Gouin* 53.
Andropogon confertus Trin.; Fourn., Mex. Pl. 2: 55. 1886. Texas, *Berlandier* 1873.
Andropogon nutans var. *avenaceus* Hack., in DC., Monogr. Phan. 6: 530. 1889. Based on *Andropogon avenaceus* Michx.
Andropogon nutans var. *linnaeanus* Hack., in DC., Monogr. Phan. 6: 531. 1889. Based on *Sorghum nutans* subsp. *linnaeanum* Hack.
Chrysopogon nutans var. *avenaceus* Coville and Branner, Rep. Geol. Surv. Ark. 4: 234. 1891. Based on *Andropogon avenaceus* Michx.
Poranthera nutans Raf.; Jacks., Ind. Kew. 3: 606. 1894, as synonym of *Chrysopogon nutans.*
Poranthera ciliata Raf.; Jacks., Ind. Kew. 3: 606. 1894, as synonym of *Chrysopogon avenaceus.*
Chrysopogon nutans var. *linnaeanus* Mohr, Bull. Torrey Bot. Club 24: 21. 1897. Based on *Sorghum nutans* subsp. *linnaeanum* Hack.
Sorghastrum avenaceum Nash, in Britton, Man. 71. 1901. Based on *Andropogon avenaceus* Michx.
Andropogon linnaeanus Scribn. and Kearn.; Scribn. and Ball., U.S. Dept. Agr., Div. Agrost. Bull. 24: 40. 1901. Based on *Sorghum nutans* subsp. *linnaeanum* Hack.
Sorghastrum linnaeanum Nash, in Small, Fl. Southeast. U.S. 66. 1903. Based on *Andropogon nutans* var. *linnaeanus* Hack., but misapplied to *S. elliottii* (Mohr) Nash.
Holcus nutans Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon nutans* L.
Holcus nutans var. *avenaceus* Hack.; Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Presumably based on *Andropogon avenaceus* Michx.
Chalcoelytrum nutans Lunell, Amer. Midl. Nat. 4: 212. 1915. Based on *Andropogon nutans* L.

(3) **Sorghastrum secundum** (Ell.) Nash, in Small, Fl. Southeast. U.S. 67. 1903. Based on *Andropogon secundus* Ell.
Andropogon secundus Ell., Bot. S.C. and Ga. 1: 580. 1821. Between Flint and Chattahoochee Rivers, Ga.
Sorghum secundum Chapm., Fl. South. U.S. 583. 1860. Based on *Andropogon secundus* Ell.
Chrysopogon secundus Benth.; Vasey, Grasses U.S. 20. 1883. Based on *Sorghum secundum* Chapm.
Andropogon unilateralis Hack., in DC., Monogr. Phan. 6: 533. 1889. Based on *Sorghum secundum* Chapm.

(147) SORGHUM Moench

(1) **Sorghum halepense** (L.) Pers., Syn. Pl. 1: 101. 1805. Based on *Holcus halepensis* L.
Holcus halepensis L., Sp. Pl. 1047. 1753. Syria.
Blumenbachia halepensis Koel., Descr. Gram. 29. 1802. Based on *Holcus sorghum* L.
Milium halepense Cav., Descr. Pl. 306. 1802. Based on *Holcus halepensis* L.
Andropogon halepensis Brot., Fl. Lusit. 1: 89. 1804. Based on *Holcus halepensis* L.
Andropogon sorghum subsp. *halepensis* Hack., in DC., Monogr. Phan. 6: 501. 1889. Based on *Holcus halepensis* L.
Andropogon halepensis var. *anatherus* Piper, Biol. Soc. Wash. Proc. 28: 28. 1915. Marco, Fla., *Hitchcock* Fla. Pl. 1900. Spikelets awnless.

Sorghum virgatum (Hack.) Stapf, in Prain, Fl. Trop. Afr. 9: 111. 1917. Based on *Andropogon sorghum* subsp. *halepensis* var. *virgatus* Hack.
Andropogon sorghum subsp. *halepensis* var. *virgatus* Hack., in DC., Monogr. Phan. 6: 504. 1889. Egypt.
Holcus virgatus Bailey, Gentes Herb. 1: 132. 1923. Based on *Andropogon sorghum* subsp. *halepensis* var. *virgatus* Hack.

(2) **Sorghum vulgare** Pers., Syn. Pl. 1: 101. 1805. Based on *Holcus sorghum* L.
Holcus sorghum L., Sp. Pl. 1047. 1753. India.
Andropogon sorghum Brot., Fl. Lusit. 1: 88. 1804. Based on *Holcus sorghum* L.
Holcus cernuus Muhl., Descr. Gram 276. 1817. Garden plant.
Andropogon vulgaris Raspail, Ann. Sci. Nat., Bot. 5: 307. 1825. Based on *Sorghum vulgare* Pers.
Sorghum vulgare var. *bicolor* Eaton and Wright, N.Amer. Bot. ed. 8. 438. 1840. Not *S. vulgare* var. *bicolor* Schrad., 1838. North America.
Sorghum sorghum Karst., Deut. Fl. 367. f. 189. 1880. Based on *Holcus sorghum* L.
Andropogon sorghum var. *sativus* Hack., in DC., Monogr. Phan. 6: 505. 1889. Group name.
Andropogon sorghum subsp. *sativus* var. *vulgaris* Hack., in DC., Monogr. Phan. 6: 515. 1889. Based on *Sorghum vulgare* Pers.
Andropogon sorghum var. *vulgaris* Hack.; Hook. f., Fl. Brit. Ind. 7: 184. 1896. Based on *A. sorghum* subsp. *sativus* var. *vulgaris* Hack.

Sorghum vulgare var. caffrorum (Thunb.) Hubb. and Rehder, Bot. Mus. Leaflets Harvard Univ. 1: 10. 1932. Based on *Holcus caffrorum* Thunb.
Holcus caffrorum Thunb., Prodr. Pl. Cap. 1: 20. 1794. South Africa.
Sorghum caffrorum Beauv., Ess. Agrost. 131, 164, 178. 1812. Based on *Holcus caffrorum* Thunb.
Holcus sorghum var. *caffrorum* Bailey, Gentes Herb. 1: 133. 1923. Based on *Holcus caffrorum* Thunb.

Sorghum vulgare var. drummondii (Nees) Hitchc., Amer. Jour. Bot. 21: 139. 1934. Based on *Andropogon drummondii* Nees.
Andropogon drummondii Nees, in Steud., Syn. Pl. Glum. 1: 393. 1854. New Orleans, La., *Drummond* 588.
Andropogon sorghum subsp. *sativus* var. *drummondii* Hack., in DC., Monogr. Phan. 6: 507. 1889. Based on *Andropogon drummondii* Nees.
Sorghum drummondii Nees; Hack., in DC., Monogr. Phan. 6: 507. 1889, as synonym of *Andropogon sorghum* subsp. *sativus* var. *drummondii* Hack.
Holcus sorghum drummondii Hitchc., Biol. Soc. Wash. Proc. 29: 128. 1916. Based on *Andropogon drummondii* Nees.

Sorghum vulgare var. durra (Forsk.) Hubb. and Rehder, Bot. Mus. Leaflets Harvard Univ. 1: 10. 1932. Based on *Holcus durra* Forsk.
Holcus durra Forsk., Fl. Aegypt. Arab. 174. 1775. Egypt and Arabia.
Andropogon sorghum subsp. *sativus* var. *durra* Hack., in DC., Monogr. Phan. 6: 516. 1889. Based on *Holcus durra* Forsk.
Holcus sorghum var. *durra* Bailey, Gentes Herb. 1: 132. 1923. Based on *Holcus durra* Forsk.

Sorghum vulgare var. roxburghii (Stapf) Haines, Bot. Bihar and Orissa pt. 5: 1034. 1924. Based on *Sorghum roxburghii* Stapf.
Sorghum roxburghii Stapf, in Prain, Fl. Trop. Afr. 9: 126. 1917. Africa.

Sorghum vulgare var. saccharatum (L.) Boerl., Ann. Jard. Bot. Buitenzorg 8: 69. 1890. Based on *Sorghum saccharatum* Pers.
Holcus saccharatus L., Sp. Pl. 1047. 1753. India.
Sorghum saccharatum Moench. Meth. Pl. 207. 1794. Based on *Holcus saccharatus* L. Listed as new Pers., Syn. Pl. 1: 101. 1805, same basis.
Andropogon saccharatus Raspail, Ann. Sci. Nat., Bot. 5: 307. 1825. Based on *Sorghum saccharatum* Pers.
Andropogon sorghum var. *saccharatus* Alefeld, Landw. Fl. 313. 1866. Based on *Holcus saccharatus* L.
Sorghum halepense var. *saccharatum* Goiran, Nuov. Gior. Bot. Ital. n. s. 17: 39. 1910. Based on *Holcus saccharatus* L.
Holcus sorghum var. *saccharatus* Bailey, Gentes Herb. 1: 132. 1923. Based on *Holcus saccharatus* L.

Sorghum vulgare var. sudanense (Piper) Hitchc., Jour. Wash. Acad. Sci. 17: 147. 1927. Based on *Andropogon sorghum sudanensis* Piper. (Published as *S. vulgare sudanense*.)
Andropogon sorghum sudanensis Piper, Biol. Soc. Wash. Proc. 28: 33. 1915. Grown at Arlington Farm (near Washington, D.C.), seed from Sudan.

Holcus sorghum sudanensis Hitchc., Biol. Soc. Wash. Proc. 29: 128. 1916. Based on *Andropogon sorghum sudanensis* Piper.

Sorghum sudanense Stapf, in Prain, Fl. Trop. Afr. 9: 113. 1917. Based on *Andropogon sorghum sudanensis* Piper.

Holcus sudanensis Bailey, Gentes Herb. 1: 132. 1923. Based on *Andropogon sorghum sudanensis* Piper.

SORGHUM VULGARE var. TECHNICUM (Koern.) Jav. Magyar Fl. 1: 63. 1924. Based on *Andropogon sorghum* var. *technicus* Koern.

Andropogon sorghum var. *technicus* Koern.; Koern. and Wern., Handb. Getreidebau. 1: 308. 1885. Cultivated.

Andropogon sorghum subsp. *sativus* var. *technicus* Koern.; Hack., in DC., Monogr. Phan. 6: 508. 1889. Based on *A. sorghum* var. *technicus* Koern.

Holcus saccharatus var. *technicus* Farwell, Mich. Acad. Sci. Ann. Rept. 20: 163. 1918. Based on *Andropogon sorghum* var. *technicus* Koern.

Holcus sorghum var. *technicus* Bailey, Gentes Herb. 1: 132. 1923. Based on *Andropogon sorghum* var. *technicus* Koern.

(99) SPARTINA Schreb.

(4) **Spartina alterniflora** Loisel., Fl. Gall. 719. 1807. France.

Dactylis maritima Walt., Fl. Carol. 77. 1788. Not *D. maritima* Curtis, 1787. South Carolina.

Trachynotia alterniflora DC., Fl. Franç. 5: 279. 1815. Based on *Spartina alterniflora* Loisel.

Spartina glabra Muhl.; Ell., Bot. S.C. and Ga. 1: 95. pl. 4. f. 2. 1816. South Carolina and Georgia.

Limnetis glabra Nutt., Gen. Pl. 1: 38. 1818, name only; Eaton and Wright, N.Amer. Bot. 301. 1840. Presumably based on *Spartina glabra* Muhl.

Spartina laevigata Bosc; Spreng., Schrad. and Link, Jahrb. Gewachsk. 1^3: 92. 1820. North America, *Bosc.*

Trachynotia alternifolia Steud., Nom. Bot. ed. 2. 2: 695. 1841, error for *T. alterniflora.*

Spartina stricta var. *alterniflora* A. Gray, Man. ed. 2. 552. 1856. Based on *S. alterniflora* Loisel.

Spartina stricta var. *glabra* A. Gray, Man. ed. 2. 552. 1856. Based on *S. glabra* Muhl.

Spartina stricta maritima Scribn., Mem. Torrey Bot. Club 5: 45. 1894. Based on *Dactylis maritima* Walt.

Spartina glabra alterniflora Merr., U.S.Dept.Agr., Bur. Plant Indus. Bull. 9: 9. 1902. Based on *Spartina alterniflora* Loisel.

Spartina glabra pilosa Merr., U.S.Dept.Agr., Bur. Plant Indus. Bull. 9: 9. 1902. Atlantic City, N.J., *Scribner* in 1895.

Spartina alterniflora var. *glabra* Fernald, Rhodora 18: 178. 1916. Based on *S. glabra* Muhl.

Spartina alterniflora var. *pilosa* Fernald, Rhodora 18: 179. 1916. Based on *S. glabra pilosa* Merr.

Spartina maritima subsp. *glabra* var. *glabra* Gray; St. Yves, Candollea 5: 24, 49. pl. 1. f.b-2. 1932. Based on *S. glabra* Muhl.

Spartina maritima subsp. *glabra* var. *alterniflora* Merr.; St. Yves, Candollea 5: 25, 53. pl. 2. f.a-4. 1932. Based on *S. alterniflora* Loisel.

Spartina maritima subsp. *glabra* subvar. *pilosa* St. Yves, Candollea 5: 51. pl. 1. f.c-3. 1932. Based on *S. glabra pilosa* Merr.

× *Spartina mcrrillii* Chevalier, Bull. Soc. France 80: 787. pl. 8. f. 3. 1933. Long Island, N.Y., *Bicknell* 11300.

(6) **Spartina bakeri** Merr., U.S.Dept.Agr., Bur. Plant Indus. Bull. 9: 14. 1902. Lake Ola, Fla., *C. H. Baker* 14.

Spartina juncea var. *bakeri* St. Yves, Candollea 5: 27, 91. pl. 9. f. c. 1932. Based on *S. bakeri* Merr.

(2) **Spartina cynosuroides** (L.) Roth, Catal. Bot. 3: 10. 1806. Based on *Dactylis cynosuroides* L.

Dactylis cynosuroides L., Sp. Pl. 71. 1753. Virginia, Canada.

Trachynotia polystachya Michx., Fl. Bor. Amer. 1: 64. 1803. New England to Florida. [Type, South Carolina, *Michaux.*]

Trachynotia cynosuroides Michx., Fl. Bor. Amer. 1: 64. 1803. Based on *Dactylis cynosuroides* L., but misapplied to *S. pectinata.*

Paspalum cynosuroides Brot., Fl. Lusit. 1: 83. 1804. Based on *Dactylis cynosuroides* L.

Limnetis cynosuroides L. Rich., in Pers., Syn. Pl. 1: 72. 1805. Based on *Dactylis cynosuroides* L.

Limnetis polystachia L. Rich., in Pers., Syn. Pl. 1: 72. 1805. Based on *Trachynotia polystachya* Michx.

Spartina polystachya Beauv., Ess. Agrost. 25, 178, 179. 1812. Presumably based on *Trachynotia polystachya* Michx.

Cynodon cynosuroides Raspail, Ann. Sci. Nat., Bot. 5: 303. 1825. Based on *Spartina cynosuroides* Roth.

Spartina cynosuroides var. *polystachya* Beal, Grasses N.Amer. 2: 398. 1896. Based on *Trachynotia polystachya* Michx.

(7) **Spartina gracilis** Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 110. 1840. North America.

(3) **Spartina leiantha** Benth., Bot. Voy. Sulph. 56. 1840. (Feb. or March.) Bay of Magdalena, Baja California, [*Barclay*].

Spartina foliosa Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 114. 1840 (later than June). California.

Spartina densiflora subvar. *brongniarti* forma *acuta* St. Yves, Candollea 5: 76, 81. 1932. Eureka, Calif. [*Heller* 13871.]

(8) **Spartina patens** (Ait.) Muhl., Descr. Gram. 55. 1817. Based on *Dactylis patens* Ait.

Dactylis patens Ait., Hort. Kew. 1: 104. 1789. Grown in England, seed from North America.

Trachynotia juncea Michx., Fl. Bor. Amer. 1: 64. 1803. South Carolina and Georgia, *Michaux.*

Limnetis juncea L. Rich., in Pers., Syn. Pl. 1: 72. 1805. Based on *Trachynotia juncea* Michx.

Spartina pumila Roth, Catal. Bot. 3: 10. 1806. New York.

Spartina juncea Willd., Enum. Pl. 81. 1809. Based on *Trachynotia juncea* Michx.

Spartina americana Roth; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 109. 1840, as synonym of *S. juncea* Willd.

Spartina patens var. *juncea* Hitchc., Rhodora 8: 210. 1906. Based on *Trachynotia juncea* Michx.

Spartina juncea subvar. *americana* St. Yves, Candollea 5: 27, 84. pl. 8. f. b-20. 1932. Based on *S. juncea* Willd.

Spartina juncea var. *patens* St. Yves, Candollea 5: 27, 86. 1932. Based on *Dactylis patens* Ait.

SPARTINA PATENS var. CAESPITOSA (A. A. Eaton) Hitchc., Rhodora 8: 210. 1906. Based on *S. caespitosa* A. A. Eaton.

Spartina caespitosa A. A. Eaton, Bull. Torrey Bot. Club 25: 338. 1898. Seabrook, N. H., *A. A. Eaton.*

(1) **Spartina pectinata** Link, Jahrb. Gewächsk 1[3]: 92. 1820. North America, [type collected by Bose probably at Wilmington, N.C.].

Spartina cynosuroides var. *aureo-marginata* Irving, Gard. Chron. 38: 372. 1905. Grown at Kew Gardens, received from New York Botanical Garden.

Spartina michauxiana Hitchc., Contrib. U.S. Natl. Herb. 12: 153. 1908. Based upon the plant described by Michaux as *Trachynotia cynosuroides* (that name based on *Dactylis cynosuroides* L.). [Near Hudson Bay, *Michaux.*]

Spartina michauxiana var. *suttiei* Farwell, Mich. Acad. Sci. Rept. 21: 352. 1920. Orchard Lake, Mich., *Suttie.*

Spartina michauxiana var. *tenuior* Farwell, Mich. Acad. Sci. Rept. 21: 352. 1920. River Rouge, Mich., [Farwell] 5138.

Spartina cynosuroides var. *michauxiana* St. Yves, Candollea 5: 58. pl. 3 f. a-7. 1932. Based on *S. michauxiana* Hitchc.

Spartina cynosuroides var. *michauxiana* forma *major* St. Yves, Candollea 5: 61, 62. 1932. Canada, *Victorin* 11358; *Victorin* and *Germain* 9055; other specimens cited from Nova Scotia, Newfoundland, Massachusetts, Ohio, Illinois, Minnesota, and Missouri.

Spartina cynosuroides × *gracilis* St. Yves, Candollea 5: 66. pl. 4. f. b-10. 1932. * * * "Oregon, Ballards Landing, *Cusick* 221 in 1890" [error for 2221 in 1899].

Spartina pectinata var. *suttiei* Fernald, Rhodora 35: 260. 1933. Based on *S. michauxiana* var. *suttiei* Farwell.

(5) **Spartina spartinae** (Trin.) Merr. U.S.Dept.Agr., Bur. Plant Indus. Bull. 9: 11. 1902, as synonym of *S. juncifornis* Engelm. and Gray; Hitchc., Contrib. U.S. Natl. Herb. 17: 329. 1913. Based on *Vilfa spartinae* Trin.

Vilfa spartinae Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 82. 1840. Texas.

Spartina junciformis Engelm. and Gray, Jour. Bost. Soc. Nat. Hist. 5: 238. 1845. Texas, *Lindheimer* [207].
Spartina gouini Fourn., Mex. Pl. 2: 135. 1886. Vera Cruz, *Gouin* 72.
Spartina multiflora Vasey; Beal, Grasses N.Amer. 2: 400. 1896, as synonym of *S. junciformis* Engelm. and Gray.
Spartina pittieri Hack., Oesterr. Bot. Ztschr. 52: 237. 1902. Costa Rica, *Pittier* 4209.
Spartina densiflora var. *junciformis* St. Yves, Candollea 5: 26, 77. pl. 7. f. a-16. 1932. Based on *S. junciformis* Engelm. and Gray.

(53) SPHENOPHOLIS Scribn.

(5) **Sphenopholis filiformis** (Chapm.) Scribn., Rhodora 8: 144. 1906. Based on *Eatonia pennsylvanica* var. *filiformis* Chapm.
Eatonia pennsylvanica var. *filiformis* Chapm., Fl. South. U.S. 560. 1860. Florida [type, *Chapman*], to South Carolina.
Eatonia filiformis Vasey, Bot. Gaz. 11: 117. 1886. Based on *Eatonia pennsylvanica* var. *filiformis* Chapm.
Eatonia hybrida Vasey; Beal, Grasses N.Amer. 2: 491. 1896. Florida, *Curtiss* in 1886. (The Hunting Creek, Va., specimen referred to is *Trisetum pennsylvanicum* (L.) Beauv., which see.)
Reboulea filiformis Farwell, Mich. Acad. Sci. Rept. 17: 182. 1916. Based on *Eatonia pennsylvanica* var. *filiformis* Chapm.
(2) **Sphenopholis intermedia** (Rydb.) Rydb., Bull. Torrey Bot. Club 36: 533. 1909. Based on *Eatonia intermedia* Rydb.
Koeleria truncata var. *major* Torr., Fl. North. and Mid. U.S. 1: 117. 1823. Deerfield, Mass., *Cooley*.
Koeleria? *pennsylvanica* var. *major* Torr., Fl. N.Y. 2: 469. 1843. Based on *Koeleria truncata* var. *major* Torr.
Reboulea pennsylvanica var. *major* A. Gray, Man. 591. 1848. Presumably based on *Koeleria truncata* var. *major* Torr.
?*Aira controversa* Steud., Syn. Pl. Glum. 1: 224. 1854. Cincinnati and Miami, Ohio.
?*Aira capillacea* Frank; Steud., Syn. Pl. Glum. 1: 224. 1854, as synonym of *A. controversa* Steud.
Eatonia pennsylvanica var. *major* A. Gray, Man. ed. 2. 558. 1856. Presumably based on *Koeleria truncata* var. *major* Torr.
Vilfa alba Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1863. Not *V. alba* Beauv., 1812. "Oregon, *Spalding*" (locality probably erroneous, the ticket on the type specimen crossed out).
Eatonia intermedia Rydb., Bull. Torrey Bot. Club 32: 602. 1905. East Gallatin Swamps, Mont., *Rydberg* 3174.
Sphenopholis pallens major Scribn., Rhodora 8: 145. 1906. Based on *Koeleria truncata* var. *major* Torr.
Sphenopholis pallens var. *major* Scribn.; Robinson, Rhodora 10: 65. 1908. Based on *Koeleria truncata* var. *major* Torr.
Reboulea pallens var. *major* Farwell, Mich. Acad. Sci. Rept. 17: 182. 1916. Based on *Koeleria truncata* var. *major* Torr.
This is the species which has recently been called *Sphenopholis pallens* Scribn., but it is not the same as *Aira pallens* Spreng., on which that name is based.
(3) **Sphenopholis longiflora** (Vasey) Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. Based on *Eatonia pennsylvanica* var. *longiflora* Vasey.
Eatonia pennsylvanica var. *longiflora* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 544. 1894. Houston, Tex., *Nealley* in 1892.
Eatonia longiflora Beal, Grasses N.Amer. 2: 494. 1896. Based on *E. pennsylvanica* var. *longiflora* Vasey.
Sphenopholis pallens longiflora Scribn., Rhodora 8: 145. 1906. Based on *Eatonia pennsylvanica* var. *longiflora* Vasey.
Reboulea pallens var. *longiflora* Farwell, Mich. Acad. Sci. Rept. 17: 182. 1916. Based on *Eatonia longiflora* Beal.
(4) **Sphenopholis nitida** (Spreng.) Scribn., Rhodora 8: 144. 1906. Based on *Aira nitida* Spreng.
Aira nitida Spreng., Mant. Fl. Hal. 32. 1807. Pennsylvania, *Muhlenberg*.
Aira pennsylvanica Spreng., Mém. Acad. St. Pétersb. 2: 299. pl. 7. 1807–08. Pennsylvania.
Koeleria pennsylvanica DC., Cat. Hort. Monsp. 117. 1813. Based on *Aira pennsylvanica* Spreng.
Aira mollis Muhl., Descr. Gram. 82. 1817. Not *A. mollis* Schreb., 1771. Pennsylvania.

Trisetum pennsylvanicum Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 66. 1830. Not *T. pennsylvanicum* Beauv. Based on *Aira pennsylvanica* Spreng.

Glyceria pennsylvanica Heynh., Nom. 1: 361. 1840. Based on *Aira pennsylvanica* Spreng.

Reboulea pennsylvanica A. Gray, Man. 591. 1848. Based on *Koeleria pennsylvanica* DC.

Eatonia pennsylvanica A. Gray, Man. ed. 2: 558. 1856. Based on *Koeleria pennsylvanica* DC.

Eatonia dudleyi Vasey, Bot. Gaz. 11: 116. 1886. Michigan to Long Island, and Pennsylvania to North Carolina. [Type, Ithaca, N.Y., *Dudley* in 1882.]

Eatonia nitida Nash, Bull. Torrey Bot. Club 22: 511. 1895. Based on *Aira nitida* Spreng.

Eatonia glabra Nash, in Britton, Man. 1043. 1901. Madison County, Tenn., *Bain* 507.

Sphenopholis nitida glabra Scribn., Rhodora 8: 145. 1906. Based on *Eatonia glabra* Nash.

Sphenopholis nitida var. *glabra* Scribn.; Robinson, Rhodora 10: 65. 1908. Based on *Eatonia glabra* Nash.

Sphenopholis glabra Heller, Muhlenbergia 6: 12. 1910. Based on *Eatonia glabra* Nash.

Reboulea nitida Farwell, Mich. Acad. Sci. Rept. 17: 181. 1916. Based on *Aira nitida* Spreng.

Reboulea nitida var. *glabra* Farwell, Mich. Acad. Sci. Rept. 17: 181. 1916. Based on *Eatonia glabra* Nash.

(1) **Sphenopholis obtusata** (Michx.) Scribn., Rhodora 8: 144. 1906. Based on *Aira obtusata* Michx.

Aira obtusata Michx., Fl. Bor. Amer. 1: 62. 1803. Carolina to Florida [type], *Michaux.*

Airopsis obtusata Desv., Jour. Bot. 1: 200. 1808. Based on "*Agrostis*" [error for *Aira*] *obtusata* Michx.

Festuca obtusata Michx.; Beauv., Ess. Agrost. 163. 1812. Name only, probably error for *Aira obtusata* Michx.

Aira truncata Muhl., Descr. Gram. 83. 1817. Pennsylvania.

Koeleria paniculata Nutt., Gen. Pl. 2: (Add. 2): 1818. East Florida, *T. Say.*

Koeleria truncata Torr., Fl. North. and Mid. U.S. 1: 116. 1823. Based on *Aira truncata* Muhl.

Poa obtusata Link, Handb. Gewächs. 1: 71. 1829. Based on *Aira obtusata* Michx.

Reboulea gracilis Kunth, Rév. Gram. 2: 341. pl. 84. 1830. New England to Florida.

Trisetum lobatum Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 66. 1830. North America.

Agrostis obtusata Steud., Nom. Bot. ed. 2. 1: 41. 1840, as synonym of *Airopsis obtusata* Desv.

Koeleria lobata Trin.; Steud., Nom. Bot. ed. 2. 1: 849. 1840. Not *K. lobata* Roem. and Schult., 1817. As synonym of *Reboulea gracilis* Kunth.

Koeleria obtusata Trin.; Steud., Nom. Bot. ed. 2. 1: 849. 1840, as synonym of *Airopsis obtusata* Desv.

Reboulea obtusata A. Gray, Man. 591. 1848. Based on *Aira obtusata* Michx.

Eatonia obtusata A. Gray, Man. ed. 2. 558. 1856. Based on *Aira obtusata* Michx.

Reboulea truncata Torr.; Munro, Jour. Linn. Soc. Bot. 6: 43. 1862, as synonym of *R. gracilis* Kunth.

Graphephorum densiflorum Fourn., Bull. Soc. Bot. France 24: 182. 1877. Name only. Mexico [Texas], *Berlandier* 1617.

Eatonia densiflora Fourn., Mex. Pl. 2: 111. 1886. Bejar, Tex., *Berlandier* 1617.

Aira mexicana Trin.; Fourn., Mex. Pl. 2: 111. 1886, as synonym of *Eatonia densiflora* Fourn.

Eatonia obtusata var. *robusta* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 544. 1894. Western Texas [Wallisville, *Wallis* in 1881] to Arizona.

Eatonia obtusata var. *robusta* Vasey; Rydb., Contrib. U.S. Natl. Herb. 3: 190. 1895. Mullen, Nebr., *Rydberg* 1807.

Eatonia obtusata var. *purpurascens* Vasey; Rydb. and Shear, U.S. Dept.Agr., Div. Agrost. Bull. 5: 30. 1897. "Vasey in U.S. Natl. Herb." This, the type, from False Washita, Okla., *Palmer* 404; Nebraska, *Shear* 252, 252½, *Rydberg* 2002, *Kearney* 271, also cited.

Eatonia pubescens Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 6 1900. Starkville, Miss., *Tracy.*

Eatonia robusta Rydb., Bull. Torrey Bot. Club 32: 602. 1905. Based on *E. obtusata* var. *robusta* Vasey.

Sphenopholis obtusata lobata Scribn., Rhodora 8: 144. 1906. Based on *Trisetum lobatum* Trin.

Sphenopholis obtusata pubescens Scribn., Rhodora 8: 144. 1906. Based on *Eatonia pubescens* Scribn. and Merr.

Eatonia annua Suksdorf, West. Amer. Sci. 15: 50. 1906. Dalles on Columbia River, Oreg., *Suksdorf* 1553. [Plants depauperate, flowering first year.]

Sphenopholis obtusata var. *pubescens* Scribn.; Robinson, Rhodora 10: 65. 1908. Based on *Eatonia pubescens* Scribn. and Merr.

Sphenopholis obtusata var. *lobata* Scribn.; Robinson, Rhodora 10: 65. 1908. Based on *Trisetum lobatum* Trin.

Sphenopholis annua Heller, Muhlenbergia 6: 12. 1910. Based on *Eatonia annua* Suksdorf.

Sphenopholis pubescens Heller, Muhlenbergia 6: 12. 1910. Based on *Eatonia pubescens* Scribn. and Merr.

Sphenopholis robusta Heller, Muhlenbergia 6: 12. 1910. Based on *Eatonia obtusata* var. *robusta* Vasey.

Reboulea obtusata var. *lobata* Farwell, Mich. Acad. Sci. Rept. 17: 182. 1916. Based on *Trisetum lobatum* Trin.

Reboulea obtusata var. *pubescens* Farwell, Mich. Acad. Sci. Rept. 17: 181. 1916. Based on *Eatonia pubescens* Scribn. and Merr.

(6) **Sphenopholis pallens** (Spreng.) Scribn., Rhodora 8: 145. 1906. Based on *Aira pallens* Spreng.

Aira pallens Spreng., Mant. Fl. Hal. 33. 1807. Pennsylvania, *Muhlenberg.*

Aira pallens Muhl., Descr. Gram. 84. 1817. No locality cited. *Aira pennsylvanica* Spreng., erroneously given as synonym, Muhlenberg's description agreeing with that of *A. pallens* Spreng., not with that of *A. pennsylvanica* Spreng.

Eatonia aristata Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 7. 1900. South Carolina, *Curtiss* in 1876.

Eatonia pallens Scribn. and Merr., U.S.Dept.Agr., Div. Agrost. Circ. 27: 7. 1900. Based on *Aira pallens* Spreng.

Trisetum aristatum Nash, in Small, Fl. Southeast. U.S. 130. 1903. Presumably based on *Eatonia aristata* Scribn. and Merr.

Sphenopholis aristata Heller, Muhlenbergia 6: 12. 1910. Based on *Eatonia aristata* Scribn. and Merr.

Reboulea pallens Farwell, Mich. Acad. Sci. Rept. 17: 181. 1916. Based on *Aira pallens* Spreng.

(76) SPOROBOLUS R. Br.

(26) **Sporobolus airoides** (Torr.) Torr., U.S. Rept. Expl. Miss. Pacif. 7: 21. 1856. Based on *Agrostis airoides* Torr.

Agrostis airoides Torr., Ann. Lyc. N.Y. 1: 151. 1824. Branches of the Arkansas River near the Rocky Mountains, *James.*

Vilfa airoides Trin.; Steud., Nom. Bot. ed. 2. 2: 766. 1841. Based on *Agrostis airoides* Torr.

Sporobolus diffusissimus Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 90. 1863. Western Texas [*Wright* 726].

(18) **Sporobolus argutus** (Nees) Kunth, Rév. Gram. 1: Sup. XVII. 1830. Based on *Vilfa arguta* Nees.

Vilfa arguta Nees, Agrost. Bras. 395. 1829. Brazil.

Vilfa arkansana Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 64. 1840. Arkansas, *Beyrich.*

Vilfa subpyramidata Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 61. 1840. Texas [received from Hooker, the type being *Drummond* 377].

Vilfa richardi Steud., Syn. Pl. Glum. 1: 153. 1854. West Indies.

Agrostis pyramidalis Rich.; Steud., Syn. Pl. Glum. 1: 153. 1854, as synonym of *Vilfa richardi* Steud.

Vilfa agrostoidea Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 88. 1863. Llano County, Tex.

Vilfa sabeana Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 90. 1863. San Saba County, Tex., *Buckley.* Given as *Vilfa* (*Sporobolus*) *sabeana.*

Sporobolus arkansanus Nutt.; Vasey, Contrib. U.S. Natl. Herb. 3: 61. 1892, as synonym of *S. argutus* Kunth.

Sporobolus sabeanus Buckl.; Vasey, Contrib. U.S. Natl. Herb. 3: 61. 1892, as synonym of *S. argutus* Kunth.

(8) **Sporobolus asper** (Michx.) Kunth, Rév. Gram. 1: 68. 1829. Based on *Agrostis aspera* Michx.

Agrostis aspera Michx., Fl. Bor. Amer. 1: 52. 1803. Illinois, *Michaux.*

Agrostis composita Poir., in Lam., Encycl. Sup. 1: 254. 1810. Carolina, *Bosc.*

Vilfa aspera Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis aspera* Michx.

Vilfa composita Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis composita* Poir.

Agrostis involuta Muhl., Descr. Gram. 72. 1817. Susquehanna, Pa., and New Jersey.

Agrostis longifolia Torr., Fl. North. and Mid. U.S. 1: 90. 1823. Kingsbridge, N.Y.; Hoboken, N.J.; Deerfield, Mass.; Pennsylvania, *Muhlenberg.*

Muhlenbergia aspera Trin.; Kunth, Enum. Pl. 1: 210. 1833. Based on *Agrostis aspera* Michx.

Muhlenbergia composita Trin.; Kunth, Enum. Pl. 1: 229. 1833. Based on *Agrostis composita* Poir.

Vilfa longifolia Torr.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 107. 1840. Based on *Agrostis longifolia* Torr.

Sporobolus longifolius Wood, Class-book 775. ed. 3. 1861. Based on *Agrostis longifolia* Torr.

Sporobolus compositus Merr., U.S.Dept.Agr., Div. Agrost. Circ. 35: 6. 1901. Based on *Agrostis composita* Poir.

SPOROBOLUS ASPER var. HOOKERI (Trin.) Vasey, Descr. Cat. Grasses U.S. 43. 1885. Based on *Vilfa hookeri* Trin.

Vilfa drummondii Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 106. 1840. Texas, received from Hooker and Endlicher [the type *Drummond* II. 306b].

Vilfa hookeri Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 106. 1840. Texas, received from Hooker [type *Drummond* II. 306].

Glyceria stricta Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1863. Middle Texas, *Buckley.* Inflorescence abnormal, the spikelets diseased, with 2 or 3 several-nerved lemmas.

Sporobolus drummondii Vasey, Descr. Cat. Grasses U.S. 44. 1885. Based on *Vilfa drummondii* Trin.

Sporobolus asper var. *drummondii* Vasey, Contrib. U.S. Natl. Herb. 3: 60. 1892. Based on *Vilfa drummondii* Trin.

Sporobolus attenuatus Nash, in Small, Fl. Southeast. U.S. 123. 1903. Starkville, Miss., *Kearney* 83.

SPOROBOLUS ASPER var. PILOSUS (Vasey) Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Based on *S. pilosus* Vasey. (Published as *S. asper pilosus.*)

Sporobolus pilosus Vasey, Bot. Gaz. 16: 26. 1891. Kansas, *Smyth.*

(25) **Sporobolus buckleyi** Vasey, Bull. Torrey Bot. Club 10: 128. 1883. Texas, *Buckley.*

(10) **Sporobolus clandestinus** (Spreng.) Hitchc., Contrib. U.S. Natl. Herb. 12: 150. 1908. Based on *Agrostis clandestina* Spreng.

Agrostis clandestina Spreng., Mant. Fl. Hal. 32. 1807. Pennsylvania, *Muhlenberg.*

Muhlenbergia clandestina Trin., Gram. Unifl. 190. 1824. Based on *Agrostis clandestina* Spreng.

Vilfa clandestina Nees; Steud., Nom. Bot. ed. 2. 2: 767. 1841. Based on *Agrostis clandestina* Spreng.

?*Vilfa riehlii* Steud., Syn. Pl. Glum. 1: 154. 1854. North America.

Sporobolus canovirens Nash; Britton, Man. 1042. 1901. Tennessee to Kansas [type, St. George, *Kellerman* in 1890], Mississippi and Texas.

(23) **Sporobolus contractus** Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *Sporobolus strictus* Merr.

Sporobolus cryptandrus var. *strictus* Scribn., Bull. Torrey Bot. Club 9: 103. 1882. Camp Lowell, Ariz., *Pringle.*

Sporobolus strictus Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 6. 1901. Not *S. strictus* Franch., 1893. Based on *Sporobolus cryptandrus* var. *strictus* Scribn.

(20) **Sporobolus cryptandrus** (Torr.) A. Gray, Man. 576. 1848. Based on *Vilfa cryptandra* Torr.

Agrostis cryptandra Torr., Ann. Lyc. N.Y. 1: 151. 1824. Canadian River [Texas or Oklahoma], *James.*

Vilfa tenacissima var. *fuscicola* Hook., Fl. Bor. Amer. 2: 239. 1839. Menzies Island, Columbia River, Wash.

Vilfa cryptandra Torr.; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 69 1840. Based on *Agrostis cryptandra* Torr.

Vilfa triniana Steud. Syn. Pl. Glum. 1: 156. 1854. [British] Columbia.

Sporobolus cryptandrus vaginatus Lunell, Amer. Midl. Nat. 2: 123. 1911. Benson County, N.Dak., *Lunell* in 1911.

Sporobolus cryptandrus var. *involutus* Farwell, Mich. Acad. Sci. Rept. 22: 179. 1921. Rochester, Mich., *Farwell* 5393.

(13) **Sporobolus curtissii** (Vasey) Small; Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 1: 24. 1895. "*S. floridanus curtissii* Vasey in Herb." cited; Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 7: 142. f. 124. 1897. Based on *S. floridanus* var. *curtissii* Vasey; Beal.

Sporobolus floridanus var. *curtissii* Vasey; Kearney, U.S.Dept.Agr., Div. Agrost. Bull. 1: 24. 1895, as synonym of *S. curtissii;* Beal, Grasses N.Amer. 2: 290. 1896. Florida, *Curtiss.*

(19) **Sporobolus domingensis** (Trin.) Kunth, Rév. Gram. 1: Sup. XVII. 1830. Based on *Vilfa domingensis* Trin.

Vilfa domingensis Trin., in Spreng., Neu. Entd. 2: 59. 1821. Dominican Republic.

Agrostis domingensis Schult., Mant. 3 (Add. 1): 570. 1827. Based on *Vilfa domingensis* Trin.

Sporobolus inordinatus Mez, Repert. Sp. Nov. Fedde 17: 294. 1921. Cuba, *Ramon de la Sagra.*

(21) **Sporobolus flexuosus** (Thurb.) Rydb., Bull. Torrey Bot. Club 32: 601. 1905. Based on *Sporobolus cryptandrus* var. *flexuosus* Thurb.

Vilfa cryptandra var. *flexuosa* Thurb.; Vasey, in Wheeler Rep. U.S. Survey 100th Merid. 6: 282. 1878. Nevada and Arizona, *Wheeler Exped.*

Sporobolus cryptandrus var. *flexuosus* Thurb., in S. Wats., Bot. Calif. 2: 269. 1880. Based on *Vilfa cryptandra* var. *flexuosa* Thurb.

(15) **Sporobolus floridanus** Chapm., Fl. South. U.S. 550. 1860. Middle and west Florida, [*Chapman*].

(24) **Sporobolus giganteus** Nash, Bull. Torrey Bot. Club 25: 88. 1898. Doña Ana County, N.Mex., *Wooton* 394.

Sporobolus cryptandrus var. *robustus* Vasey, Contrib. U.S. Natl. Herb. 1: 56 1890. Texas, *Nealley* [746].

Sporobolus cryptandrus var. *giganteus* Jones, Contrib. West. Bot. 14: 11. 1912. Based on *S. giganteus* Nash.

(16) **Sporobolus gracilis** (Trin.) Merr., Rhodora 4: 48. 1902. Based on *Vilfa gracilis* Trin.

Agrostis juncea Michx., Fl. Bor. Amer. 1: 52. 1803. Not. *A. juncea* Lam., 1783. Carolina, *Michaux.*

Heleochloa juncea Beauv., Ess. Agrost. 24, 147. 1812. Based on *Agrostis juncea* Michx.

Colpodium junceum Trin., in Spreng., Neu. Entd. 2: 37. 1821. Based on *Agrostis juncea* Michx.

Crypsis juncea Steud., Nom. Bot. 1: 242. 1821. Based on *Agrostis juncea* Michx.

Vilfa juncea Trin., Gram. Unifl. 157. 1824. Based on *Agrostis juncea* Michx.

Sporobolus junceus Kunth, Rév. Gram. 1: 68. 1829. Based on *Agrostis juncea* Michx.

Vilfa schiedeana Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 73. 1840. Arkansas, "Schiede." [Type specimen annotated by Ruprecht "Beyrich non Schiede."]

Vilfa gracilis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 74. 1840. Carolina.

Vilfa fulvescens Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 76. 1840. North America, *Bosc,* Willdenow Herb. no. 1750.

Agrostis thyrsoides Bosc; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 76. 1840, as synonym of *Vilfa fulvescens* Trin.

Vilfa subsetacea Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4¹: 133 (in note). 1840. Based on *V. gracilis* Trin., op. cit. (page 74, not op. cit. page 104). (See synonymy under *Muhlenbergia cuspidata.*) Discovering that he had named two distinct species *Vilfa gracilis,* Trinius changed the first to *V. subsetacea.* Since *V. gracilis* has come into use under *Sporobolus* and is valid, it is retained over *V. subsetacea, V. schiedeana,* and *V. fulvescens* all of the same date.

Vilfa vinzenti Steud., Syn. Pl. Glum. 1: 155. 1854. [Rusk County], Tex., *Vinzent* 62.

Aira triglumis Steud., Syn. Pl. Glum. 1: 223. 1854. [Rusk County], Tex., *Vincent* 62.

Bennetia juncea Raf.; Jacks., Ind. Kew. 1: 291. 1893, as synonym of *Sporobolus junceus*. Rafinesque (Bull. Bot. Seringe 1: 220. 1830) cites *Agrostis juncea* Michx., after his description of the new genus *Bennetia*, but does not transfer the specific name.

Sporobolus ejuncidus Nash, in Britton, Man. 106. 1901. Based on *Sporobolus junceus* Kunth.

(12) **Sporobolus heterolepis** (A. Gray) A. Gray, Man. 576. 1848. Based on *Vilfa heterolepis* A. Gray.

Vilfa heterolepis A. Gray, Ann. Lyc. N.Y. 3: 233. 1835. Watertown, N.Y., *Crawe*.

Agrostis heterolepis Wood, Class-book ed. 2. 598. 1847. Based on *Vilfa heterolepis* Gray.

(5) **Sporobolus indicus** (L.) R. Br., Prodr. Fl. Nov. Holl. 170. 1810. Based on *Agrostis indica* L.

Agrostis indica L., Sp. Pl. 63. 1753. "India", but the type from Jamaica, sent by Patrick Browne.

Agrostis elongata Lam., Tabl. Encycl. 1: 162. 1791. Not *Sporobolus elongatus* R. Br., 1810. South America. *Agrostis indica* L. cited as synonym.

Vilfa elongata Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis elongata* Lam.

Sporobolus lamarckii Desv.; Hamilt., Prodr. Pl. Ind. Occ. 4. 1825. Based on *Agrostis elongata* Lam.

Sporobolus jacquemontii Kunth, Rév. Gram. 2: 427. pl. 127. 1831. Dominican Republic.

Vilfa jacquemontii Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 92. 1840. Based on *Sporobolus jacquemontii* Kunth.

Vilfa indica Trin.; Steud., Nom. Bot. ed. 2. 2: 767. 1841. Based on *Agrostis indica* L.

Sporobolus littoralis var. *elongatus* Dur. and Schinz, Consp. Fl. Afr. 5: 821. 1894. Based on *Vilfa elongata* Beauv.

(11) **Sporobolus interruptus** Vasey, Bull. Torrey Bot. Club 15: 8. 1888. Arizona, *Coues* and *Palmer* 66 in 1886; San Francisco Forest, *Rusby* 15 in 1883 [the Rusby specimen, distributed as no. 885, the type].

Sporobolus arizonicus Thurb.; Vasey, Bull. Torrey Bot. Club 15: 8. 1888, as synonym of *Sporobolus interruptus* Vasey.

(9) **Sporobolus macrus** (Trin.) Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *Vilfa macra* Trin.

Vilfa macra Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 79. 1840. Louisiana.

(2) **Sporobolus microspermus** (Lag.) Hitchc., Jour. Wash. Acad. Sci. 23: 453. 1933. Based on *Milium microspermum* Lag.

Milium microspermum Lag., Gen. and Sp. Nov. 2. 1816. Grown from seed sent from Mexico by Sessé.

Agrostis minutissima Steud., Syn. Pl. Glum. 1: 171. 1854. New Mexico, *Fendler* 986.

Vilfa confusa Fourn., Mex. Pl. 2: 101. 1886. Mexico (several localities cited including *Schiede* and *Deppe* 913 which is the basis of "*Vilfa ramulosa* Schlecht." cited by Fournier); United States, *Hall* and *Harbour* 643.

Sporobolus confusus Vasey, Bull. Torrey Bot. Club 15: 293. 1888. Based on *Vilfa confusa* Fourn.

Sporobolus confusus var. *aberrans* Jones, Contrib. West. Bot. 14: 10. 1912. Bowie, Ariz., and Colonia Juárez, Mexico, [*Jones*].

Sporobolus minutissimus Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Based on *Agrostis minutissima* Steud.

(22) **Sporobolus nealleyi** Vasey, Bull. Torrey Bot. Club 15: 49. 1888, name only; Contrib. U.S. Natl., Herb. 1: 57. 1890. Brazos Santiago, Tex., *Nealley*.

(7) **Sporobolus neglectus** Nash, Bull. Torrey Bot. Club 22: 464. 1895. Massachusetts to Kentucky, Tennessee, and Kansas. [Type, Woodruff Gap, N.J., *Britton* in 1887.]

Sporobolus vaginaeflorus neglectus Scribn., U.S. Dept. Agr., Div. Agrost. Bull. 17 (ed. 2): 170. f. 466. 1901. Based on *S. neglectus* Nash.

Sporobolus ozarkanus Fernald, Rhodora 35: 109. 1933. Webb City, Mo., *Palmer* 3133.

(4) **Sporobolus poiretii** (Roem. and Schult.) Hitchc., Bartonia 14: 32. 1932. Based on *Axonopus poiretii* Roem. and Schult.

Agrostis compressa Poir., in Lam., Encycl. Sup. 1: 258. 1810. Not *A. compressa* Willd., 1790, nor Poir. (op. cit.) 1: 259. 1810. Carolina, *Bosc.*
Milium compressum Poir., in Lam., Encycl. Sup. 1: 258. 1810. Not *M. compressum* Swartz, 1788. As synonym of *Agrostis compressa* Poir.
Axonopus poiretii Roem. and Schult., Syst. Veg. 2: 318. 1817. Based on *Agrostis compressa* Poir., "n. 78," not *A. compressa* Willd., 1790, nor Poir. (op. cit.) no. 82, on the following page.
Agrostis tenuissima Spreng., Syst. Veg. 1: 258. 1825. West Indies and South America.
Vilfa exilis Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 89. 1840. Jalapa, Mexico, [*Schiede*].
Vilfa berteroana Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 100. 1840. Dominican Republic, *Bernhardi.*
Sporobolus angustus Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 88. 1863. "Buchanan county" [probably error for Buchanan] Tex., [*Buckley*].
Vilfa tenacissima var. *exilis* Fourn., Mex. Pl. 2: 99. 1886. Based on *Vilfa exilis* Trin.
Sporobolus berteroanus Hitchc. and Chase, Contrib. U.S. Natl. Herb. 18: 370. 1917. Based on *Vilfa berteroana* Trin.
This species has been included in *Sporobolus indicus* in some manuals.
(17) **Sporobolus purpurascens** (Swartz) Hamilt., Prodr. Pl. Ind. Occ. 5. 1825. Based on *Agrostis purpurascens* Swartz.
Agrostis purpurascens Swartz, Prodr. Veg. Ind. Occ. 25. 1788. Jamaica, *Swartz.*
Vilfa purpurascens Beauv., Ess. Agrost. 16, 182. 1812. Based on *Agrostis purpurascens* Swartz.
Vilfa grisebachiana Fourn., Mex. Pl. 2: 98. 1886. Cuba, *Wright* 3427a.
Vilfa liebmanni Fourn., Mex. Pl. 2: 100. 1886. Mexico, *Liebmann* 693.
(1) **Sporobolus ramulosus** (H.B.K.) Kunth, Rév. Gram. 1: 68. 1829. Based on *Vilfa ramulosa* H.B.K.
Vilfa ramulosa H.B.K., Nov. Gen. and Sp. 1: 137. 1815. Jorullo, Mexico, *Humboldt* and *Bonpland.*
Agrostis ramulosa Roem. and Schult., Syst. Veg. 2: 361. 1817. Based on *Vilfa ramulosa* H.B.K.
Vilfa minima Vasey, U.S.Dept.Agr. Monthly Rept. 1874: 155. 1874. Not *V. minima* Trin., 1854. Twin Lakes, Colo., *Wolf* 1077.
Sporobolus wolfii Vasey, Bull. Torrey Bot. Club 10: 52. 1883. Twin Lakes, Colo., *Wolf* [1077].
Sporobolus racemosus Vasey, Bull. Torrey Bot. Club 14: 9. 1887. Chihuahua, Mexico, *Palmer* [4B in 1885].
Muhlenbergia wolfii Rydb., Bull. Torrey Bot. Club 32: 600. 1905. Based on *Sporobolus wolfii* Vasey.
(14) **Sporobolus teretifolius** Harper, Bull. Torrey, Bot. Club 33: 229. 1906. Near Moultrie, Ga., *Harper* 1642.
(28) **Sporobolus texanus** Vasey, Contrib. U.S. Natl. Herb. 1: 57. 1890. Screw Bean, Presidio County, Tex., *Nealley* [755].
(29) **Sporobolus tharpii** Hitchc., Biol. Soc. Wash. Proc. 41: 161. 1928. Padre Island, Tex., *Tharp* 4772.
(6) **Sporobolus vaginiflorus** (Torr.) Wood, Class-book 775. ed. 3. 1861. Based on *Vilfa vaginiflora* Torr.
Vilfa vaginiflora Torr.; Gray, Gram. and Cyp. 1: no. 3. 1834; Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 4[1]: 56. 1840. New Jersey.
Cryptostachys vaginata Steud., Flora 33: 229. 1850, name only; Syn. Pl. Glum. 1: 181. 1854. North America.
Sporobolus minor Vasey; A. Gray, Man. ed. 6. 646. 1890. Not *S. minor* Kunth, 1830. Virginia to North Carolina [type, *Boynton*], Tennessee and Texas.
Sporobolus filiculmis L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 519. 1894. Not *S. filiculmis* Vasey, 1885. Based on *S. minor* Vasey.
Sporobolus ovatus Beal, Grasses N.Amer. 2: 300. 1896. Based on *S. minor* Vasey.
Sporobolus vaginatus Scribn., Bot. Gaz. 21: 15. 1896. Based on *Cryptostachys vaginata* Steud.
?*Sporobolus vaginiflorus* var. *minor* Scribn.; Chapm., Fl. South. U.S. ed. 3. 598. 1897. North Carolina and Tennessee.
Sporobolus vaginiflorus var. *inaequalis* Fernald, Rhodora 35: 109. 1933. Concord, N.H., *Batchelder* in 1901.

(3) **Sporobolus virginicus** (L.) Kunth, Rév. Gram. 1: 67. 1829. Based on *Agrostis virginica* L.
Agrostis virginica L., Sp. Pl. 63. 1753. Virginia.
Agrostis littoralis Lam., Tabl. Encycl. 1: 161. 1791. South America, *Richard.*
Vilfa littoralis Beauv., Ess. Agrost. 16, 147, 181. 1812. Based on *Agrostis littoralis* Lam.
Vilfa virginica Beauv., Ess. Agrost. 16, 182. 1812. Based on *Agrostis virginica* L.
Agrostis pungens Muhl., Descr. Gram. 72. 1817. Not *A. pungens* Schreb., 1769. Eastern United States.
Crypsis virginica Nutt., Gen. Pl. 1: 49. 1818. Based on *Agrostis virginica* Willd. [error for L.].
Podosaemum virginicum Link, Hort. Berol. 1: 85. 1827. Based on *Agrostis virginica* L.
Sporobolus littoralis Kunth, Rév. Gram. 1: 68. 1829. Based on *Agrostis littoralis* Lam.

(27) **Sporobolus wrightii** Munro; Scribn., Bull. Torrey Bot. Club 9: 103. 1882. Pantano, Ariz., *Pringle.*
Bauchea karwinskyi Fourn., Mex. Pl. 2: 87. 1886. Mexico, *Karwinsky* 1015, 1015b.
Sporobolus altissimus Vasey, Calif. Acad. Sci. Proc. II. 2: 212. 1889. San Diego, Calif., *Palmer* [in 1888].
Sporobolus altissimus var. *minor* Vasey, Calif. Acad. Sci. Proc. II. 2: 213. 1889. San Enrique, Calif. [*Brandegee*].

(123) STENOTAPHRUM Trin.

(1) **Stenotaphrum secundatum** (Walt.) Kuntze, Rev. Gen. Pl. 2: 794. 1891 Based on *Ischaemum secundatum* Walt. Kuntze misspells the specific name "*secundum.*"
Ischaemum secundatum Walt., Fl. Carol. 249. 1788. South Carolina.
Rottboellia stolonifera Poir., in Lam., Encycl. 6: 310. 1804. Puerto Rico, *Ledru.*
Stenotaphrum americanum Schrank, Pl. Rar. Hort. Monac. pl. 98. "1819." Since Schrank cites Trin., Fund. Agrost. 1820, his work must be later than that of Trinius. Greenhouse plant.
Stenotaphrum sarmentosum Nees, Agrost. Bras. 93. 1829. Based on *Rottboellia stolonifera* Poir.
Stenotaphrum glabrum var. *amcricanum* Doell, in Mart., Fl. Bras. 2^2: 300. 1877. Based on *Stenotaphrum amcricanum* Schrank.
Stenotaphrum dimidiatum var. *americanum* Hack., in Stuck., An. Mus. Nac. Buenos Aires 21: 57. 1911. Based on *Stenotaphrum americanum* Schrank.
Stenotaphrum dimidiatum var. *secundum* [*secundatum*] Domin, Bibl. Bot. 85: 332. 1915. Based on *Ischaemum secundatum* Walt.
Stenotaphrum secundatum var. *variegatum* Hitchc., in Bailey, Stand. Cycl. Hort. 6: 3237. 1917. Greenhouse plant.

(84) STIPA L.

(31) **Stipa arida** Jones, Calif. Acad. Sci. Proc. II. 5: 725. 1895. Marysvale, Utah, *Jones* 5377.
Stipa mormonum Mez, Repert. Sp. Nov. Fedde 17: 209. 1921. Utah, *Jones* [2106].

(8) **Stipa avenacea** L., Sp. Pl. 78. 1753. Virginia.
Stipa barbata Michx., Fl. Bor. Amer. 1: 53. 1803. Not *S. barbata* Desf. 1798. Virginia and Carolina, *Michaux.*
Stipa virginica Pers., Syn. Pl. 1: 99. 1805. Based on *S. barbata* Michx.
Stipa diffusa Willd.; Steud., Nom. Bot. ed. 2. 2: 643. 1841, as synonym of *Stipa avenacea* L.
Stipa avenacea var. *bicolor* Eaton and Wright, N.Amer. Bot. ed. 8. 444, 1848. Philadelphia and Chester, Pa.; Boston, Mass.; Ontario; Florida.
Podopogon avenaceum Raf.; Jacks., Ind. Kew. 3: 580. 1894, as synonym of *Stipa avenacea.*

(7) **Stipa avenacioides** Nash, Bull. Torrey Bot. Club 22: 423. 1895. Cassia, Lake County, Fla., *Nash* 2051.

Stipa brachychaeta Godr., Mem. Acad. Monsp. (Sec. Medic.) 1: 450. 1853. Originally described from specimens from unknown source. Native of southern South America.

(21) **Stipa californica** Merr. and Davy, Univ. Calif. Pubs., Bot. 1: 61. 1902. San Jacinto Mountains, Calif., *Hall* 2556.

(27) **Stipa columbiana** Macoun, Cat. Can. Pl. 2[1]: 191. 1888. Yale, British Columbia, *Macoun* [28,940]; Victoria, Vancouver Island, *Macoun* [28,941].

Stipa viridula var. *minor* Vasey, Contrib. U.S. Natl. Herb. 3: 50. 1892. [Kelso Mountain, Colo., *Letterman* 95.]

Stipa minor Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 46. 1898. Based on *S. viridula* var. *minor* Vasey.

STIPA COLUMBIANA var. NELSONI (Scribn.) Hitchc., Contrib. U.S. Natl. Herb. 24: 254. 1925. Based on *S. nelsoni* Scribn. (Published as *S. columbiana nelsoni*.)

Stipa occidentalis [Thurb.; misapplied by] Boland., Proc. Calif. Acad. 4: 169. 1872. Larger plant with "awns almost entirely smooth", confused with true *S. occidentalis*.

Stipa nelsoni Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 46. 1898. Albany County, Wyo., *A. Nelson* 3963.

(10) **Stipa comata** Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5[1]: 75. 1842. Carlton House Fort, Saskatchewan River, *Drummond;* Columbia River, near Missouri Portage, *Douglas*.

Stipa comata intonsa Piper, Contrib. U.S. Natl. Herb. 11: 109. 1906. Rockland, Klickitat County, Wash., *Suksdorf* 1026.

This is the species described by Pursh (Fl. Amer. Sept. 1: 72. 1814), and Nuttall (Gen. Pl. 1: 58. 1818) under *Stipa juncea* L., and by Hooker (Fl. Bor. Amer. 2: 257. 1840) under *S. capillata* L.

STIPA COMATA var. INTERMEDIA Scribn. and Tweedy, Bot. Gaz. 11: 171. 1886. Junction Butte, Yellowstone Park, *Tweedy* 610.

Stipa tweedyi Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 47. 1898. Based on *S. comata intermedia* Scribn.

Stipa spartea var. *tweedyi* Jones, Contrib. West. Bot. 14: 11. 1912. Based on *S. tweedyi* Scribn.

(5) **Stipa coronata** Thurb., in S. Wats., Bot. Calif. 2: 287. 1880. California, Julian, *Bolander;* San Bernardino, *Parry* and *Lemmon* 422.

STIPA CORONATA var. DEPAUPERATA (Jones) Hitchc., Jour. Wash. Acad. Sci. 24: 292. 1934. Based on *S. parishii* var. *depauperata* Jones.

Stipa parishii Vasey, Bot. Gaz. 7: 33. 1882. San Bernardino Mountains, Calif., *Parish* 1079.

Stipa parishii var. *depauperata* Jones, Contrib. West. Bot. 14: 11. 1912. Detroit, Utah [*Jones*].

Stipa coronata parishii Hitchc., Contrib. U.S. Natl. Herb. 24: 227. 1925. Based on *S. parishii* Vasey.

(22) **Stipa curvifolia** Swallen, Jour. Wash. Acad. Sci. 23: 456. 1933. Guadalupe Mountains, N.Mex., *Wilkins* 1660.

Stipa elegantissima Labill., Nov. Holl. Pl. 1: 23. pl. 29. 1804. Australia.

(17) **Stipa elmeri** Piper and Brodie; Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 46. 1898. Based on *S. viridula* var. *pubescens* Vasey.

Stipa viridula var. *pubescens* Vasey, Contrib. U.S. Natl. Herb. 3: 50. 1892. Not *S. pubescens* R. Br., 1810. Washington, *Suksdorf*.

(13) **Stipa eminens** Cav., Icon. Pl. 5: 42. pl. 467. f. 1. 1799. Chalma, Mexico.

Stipa erecta Fourn., Mex. Pl. 2: 75. 1886. Not *S. erecta* Trin., 1824. Tehuacan, Mexico, *Liebmann* 654.

Stipa flexuosa Vasey, Bull. Torrey Bot. Club 15: 49. 1888. Western Texas, [Chenate Mountains], *Nealley*.

(18) **Stipa latiglumis** Swallen, Jour. Wash. Acad. Sci. 23: 198. f. 1. 1933. Camp Lost Arrow, Yosemite Valley, Calif., *Abrams* 4469.

(24) **Stipa lemmoni** (Vasey) Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 3. 1901. Based on *S. pringlei* var. *lemmoni* Vasey.

Stipa pringlei var. *lemmoni* Vasey, Contrib. U.S. Natl. Herb. 3: 55. 1892. Plumas County, Calif., *Lemmon* [5456].

Stipa lemmoni var. *jonesii* Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 4. 1901. Emigrant Gap, Calif., *Jones* 3298.

(14) **Stipa lepida** Hitchc., Amer. Jour. Bot. 2: 302. 1915. Santa Ynez Forest, Calif., *Chase* 5611.

STIPA LEPIDA var. ANDERSONII (Vasey) Hitchc., Amer. Jour. Bot. 2: 303. 1915. Based on *S. eminens* var. *andersonii* Vasey. (Published as *S. lepida andersonii*.)

Stipa eminens var. *andersonii* Vasey, Contrib. U.S. Natl. Herb. 3: 54. 1892. California, [Santa Cruz, *Anderson* 58, type]. "Lower California", cited by Vasey is erroneous.

Stipa hassei Vasey, Contrib. U.S. Natl. Herb. 1: 267. 1893. Santa Monica, Calif., *Hasse*. Abnormal specimen, the spikelets distorted by a smut.

(28) **Stipa lettermani** Vasey, Bull. Torrey Bot. Club 13: 53. 1886. Snake River, Idaho, *Letterman* [102].

Stipa viridula var. *lettermani* Vasey, Contrib. U.S. Natl. Herb. 3: 50. 1892. Presumably based on *S. lettermani* Vasey.

(3) **Stipa leucotricha** Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5^1: 54. 1842. Texas, from Hooker.

Stipa ciliata Scheele, Linnaea 22: 342. 1849. New Braunfels, Tex., *Römer*.

(20) **Stipa lobata** Swallen, Jour. Wash. Acad. Sci. 23: 199. f. 2. 1933. Ranger Station, Queen, Guadalupe Mountains, N.Mex., *Hitchcock* (*Amer. Gr. Nat. Herb.* 819).

Stipa neesiana Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5^1: 27. 1842. Montevideo, *Sellow*.

(1) **Stipa neomexicana** (Thurb.) Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 132. f. 428. 1899. Based on *S. pennata* var. *neo-mexicana* Thurb.

Stipa pennata var. *neo-mexicana* Thurb., in Coulter, Man. Rocky Mount. 408. 1885. New Mexico [type, Rio Mimbres, *Thurber* 269], Colorado, and Texas.

(19) **Stipa occidentalis** Thurb.; S. Wats., in King, Geol. Expl. 40th Par. 5: 380. 1871. Yosemite Trail, Calif., *Bolander* 5038.

Stipa stricta Vasey, Bull. Torrey Bot. Club 10: 42. 1883. Not *S. stricta* Lam. 1791. Washington (erroneously cited as Oregon), *Suksdorf*.

Stipa stricta var. *sparsiflora* Vasey, Contrib. U.S. Natl. Herb. 3: 51. 1892. Yosemite Trail, Calif., *Bolander* 5038.

Stipa oregonensis Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 130. f. 426. 1899. Based on *S. stricta* Vasey.

Stipa occidentalis montana Merr. and Davy, Univ. Calif. Pubs., Bot. 1: 62. 1902. Yosemite Trail, *Bolander* 5038.

Stipa pennata L., Sp. Pl. 78. 1753. Europe.

(30) **Stipa pinetorum** Jones, Calif. Acad. Sci. Proc. II. 5: 724. 1895. Panguitch Lake, Utah, *Jones* 6023 p.

(15) **Stipa porteri** Rydb., Bull. Torrey Bot. Club 32: 599. 1905. Based on the plant described as *S. mongolica* Turcz. by Porter and Coulter (Syn. Fl. Colo. 145. 1874). [Rocky Mountains, *Hall* and *Harbour* 648, [error for 646].

This is the species described under the name *Oryzopsis mongolica* (Turcz.) Beal (Bot. Gaz. 15: 111. 1890), but the name is based on *Stipa mongolica* Turcz., an Asiatic species.

(12) **Stipa pringlei** Scribn.; Vasey, Contrib. U.S. Natl. Herb. 3: 54. 1892. Mexico, *Pringle* [1410 type], and Arizona, *Pringle, Lemmon, Tracy*. No reference to *Oryzopsis pringlei* Beal.

Oryzopsis pringlei Beal, Bot. Gaz. 15: 112. 1890. Chihuahua, Mexico, *Pringle* 1410.

Stipa pringlei Scribn.; Beal, Bot. Gaz. 15: 112. 1890, as synonym of *Oryzopsis pringlei* Beal.

Oryzopsis erecta Beal, Grasses N.Amer. 2: 230. 1896. Apparently based on *O. pringlei* Beal, *Pringle* 1410 being cited, the name changed because of *O. pringlei* Scribn.; Beal 1896 (page 226 of the same work). The latter is the same as *Stipa virescens* H.B.K. of Mexico, not known from the United States. Beal erroneously gives the authority of *O. erecta* as "(Scribn.) Beal."

(11) **Stipa pulchra** Hitchc., Amer. Jour. Bot. 2: 301. 1915. Healdsburg, Sonoma County, Calif., *Heller* 5252.

(6) **Stipa richardsoni** Link, Hort. Berol. 2: 245. 1833. Western North America. Grown at Berlin from seed sent by Richardson.

Stipa richardsoni var. *major* Macoun, Cat. Can. Pl. 2^4: 191. 1888, without description. Columbia Valley, British Columbia, *Macoun*.

Oryzopsis richardsoni Beal, Bot. Gaz. 15: 111. 1890. Based on *Stipa richardsoni* Link, but misapplied to *Oryzopsis canadensis*.

(26) **Stipa robusta** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 5: 23. 1897. Based on *S. viridula* var. *robusta* Vasey. Not invalidated by *S. robusta* Nutt.; Trin. and Rupr., published as synonym of *S. spartea*.

Stipa viridula var. *robusta* Vasey, Contrib. U.S. Natl. Herb. 1: 56. 1890. Presidio County, Tex., *Nealley* [714].

Stipa vaseyi Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 46. 1898. Based on *S. viridula* var. *robusta* Vasey.

(23) **Stipa scribneri** Vasey, Bull. Torrey Bot. Club 11: 125. 1884. Santa Fe, N.Mex. [*Vasey*].

(9) **Stipa spartea** Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 82. 1830. North America [Rocky Mountains near the Missouri]. By typographical error the name is spelled "sparta."

Stipa robusta Nutt.; Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5^1: 69. 1842, as synonym of *S. spartea.*

STIPA SPARTEA var. CURTISETA Hitchc., Contrib. U.S. Natl. Herb. 24: 230. 1925. Hound Creek Valley, Mont., *Scribner* 339. (Published as *S. spartea curtiscta.*)

(2) **Stipa speciosa** Trin. and Rupr., Mém. Acad. St. Pétersb. VI. Sci. Nat. 5^1: 45. 1842. Chile, *Cuming.*

Stipa californica Vasey, Amer. Acad. Proc. 24: 80. 1889. Name only for Palmer's no. 505 in 1887 from Los Angeles Bay, Baja California.

Stipa speciosa var. *minor* Vasey, Contrib. U.S. Natl. Herb. 3: 52. 1892. Empire City, Nev., *Jones.*

Stipa humilis var. *jonesiana* Kuntze, Rev. Gen. Pl. 3^2: 371. 1898. Empire City, Nev., *Jones* 4111.

Stipa humilis var. *speciosa* Kuntze, Rev. Gen. Pl. 3^2: 371. 1898. Based on *S. speciosa* Trin. and Rupr.

(4) **Stipa stillmanii** Boland., Calif. Acad. Sci. Proc. 4: 169. 1872. Blue Canyon, Sierra Nevada, Calif., *Bolander.*

Stipa tenacissima L., Cent. Pl. 1: 6. 1755; Amoen. Acad. 4: 266. 1759. Spain.

(32) **Stipa tenuissima** Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 36. 1836. Mendoza "Chile", [Argentina], *Gillies.*

Stipa cirrosa Fourn., Mex. Pl. 2: 75. 1886. Mexico, *Karwinsky* 1009.

Stipa subulata Fourn., Mex. Pl. 2: 75. 1886. Mexico, *Karwinsky* 1009b.

(16) **Stipa thurberiana** Piper, U.S.Dept.Agr., Div. Agrost. Circ. 27: 10. 1900. Washington, north branch of the Columbia and Okanagan, *Pickering* and *Brackenridge.*

Stipa occidentalis Thurb., in Wilkes, U.S. Expl. Exped. Bot. 17: 483. 1874. Not *S. occidentalis* Thurb.; S. Wats., 1871. North Branch of the Columbia River [Washington, *Pickering* and *Brackenridge*].

(25) **Stipa viridula** Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 39. 1836. North America [Saskatchewan].

Stipa parviflora [Desf., misapplied by] Nuttall, Gen. Pl. 1: 59. 1818. Plains of the Missouri.

Stipa nuttalliana Steud., Nom. Bot. ed. 2. 2: 643. 1841. Based on *Stipa parviflora* as described by Nuttall.

Stipa sparta Trin.; Hook., Fl. Bor. Amer. 2: 237. 1840. Name only. *S. parviflora* Nutt., not Desf., cited as synonym.

(29) **Stipa williamsii** Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 45. 1898. Big Horn Mountain, Wyo., *Williams* 2804.

Thysanolaena maxima (Roxb.) Kuntze, Rev. Gen. Pl. 2: 794. 1891. Based on *Agrostis maxima* Roxb.

Agrostis maxima Roxb., Fl. Ind. 1: 319. 1820. India.

Thysanolaena agrostis Nees, Edinburgh New Phil. Jour. 18: 180. 1835. Based on *Agrostis maxima* Roxb.

(151) TRACHYPOGON Nees

(1) **Trachypogon montufari** (H.B.K.) Nees, Agrost. Bras. 342. 1829. Based on *Andropogon montufari* H.B.K.

Andropogon montufari H.B.K., Nov. Gen. and Sp. 1: 184. 1816. Ecuador, *Humboldt* and *Bonpland.*

Heteropogon stipoides Presl, Rel. Haenk. 1: 335. 1830. Mexico, *Haenke.*

Heteropogon secundus Presl, Rel. Haenk. 1: 335. 1830. Mexico, *Haenke.*

Andropogon secundus Kunth, Rév. Gram. 1: Sup. XXXIX. 1830. Not *A. secundus* Ell., 1821. Based on *Heteropogon secundus* Presl.

Andropogon stipoides Kunth, Enum. Pl. 1: 487. 1833. Not *A. stipoides* H.B.K. Based on *Heteropogon stipoides* Presl.

Trachypogon preslii Anderss. Öfvers. Svensk. Vetensk. Akad. Förhandl. 14: 50. 1857. Based on *Heteropogon stipoides* Presl.

Trachypogon preslii var. *secundus* Anderss., Öfvers. Svensk. Vetensk. Akad. Förhandl. 14: 50. 1857. Based on *Heteropogon secundus* Presl.

Trachypogon polymorphus var. *montufari* Hack., in Mart., Fl. Bras. 2^3: 263. 1883. Based on *Andropogon montufari* H.B.K.

Trachypogon polymorphus var. *montufari* subvar. *secundus* Hack., in DC., Monogr. Phan. 6: 326. 1889. Based on *Heteropogon secundus* Presl.

Trachypogon secundus Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 32: 1. 1901. Based on *Heteropogon secundus* Presl.

Trachypogon plumosus var. *montufari* Hack.; Henr., Med. Rijks Herb. Leiden 40: 40. 1921. Based on *Andropogon montufari* H.B.K.

Trachypogon plumosus var. *montufari* subvar. *secundus* Hack.; Henr., Med. Rijks Herb. Leiden 40: 40. 1921. Based on *Heteropogon secundus* Presl.

(86) TRAGUS Hall.

(1) **Tragus berteronianus** Schult., Mant. 2: 205. 1824. Dominican Republic, *Bertero.*

Tragus occidentalis Nees, Agrost. Bras. 286. 1829. Brazil.

Lappago berteroniana Schult.; Steud., Syn. Pl. Glum. 1: 112. 1854, erroneously cited as synonym of *L. aliena* Spreng.

Tragus racemosus var. *brevispicula* Doell, in Mart., Fl. Bras. 2^3: 123. pl. 18. 1877. Brazil.

Nazia occidentalis Scribn., Zoe 4: 386. 1894. Based on *Tragus occidentalis* Nees.

Lappago occidentalis Nees; Hook. f., Fl. Brit. Ind. 7: 97. 1896. Presumably based on *Tragus occidentalis* Nees; erroneously cited as synonym of *Tragus racemosus* All.

The following two names refer to *Tragus berteronianus*, though they are based on *Lappago alienus* Spreng., which is *Pseudechinolaena polystachya* (H.B.K.) Stapf.

Nazia racemosa aliena Scribn. and Smith, U.S.Dept.Agr., Div. Agrost. Bull. 4: 12. 1897. Based on *Lappago aliena* Spreng.

Nazia aliena Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17: 28. f. 324. 1899. Based on *Lappago aliena* Spreng.

(2) **Tragus racemosus** (L.) All., Fl. Pedem. 2: 241. 1785. Based on *Cenchrus racemosus* L.

Cenchrus racemosus L., Sp. Pl. 1049. 1753. Southern Europe.

Lappago racemosa Honck., Syn. Pl. Germ. 1: 440. 1792. Based on *Cenchrus racemosus* L.

Tragus muricatus Moench, Meth. Pl. 53. 1794. Based on *Cenchrus racemosus* L.

Tragus racemosus var. *longispicula* Doell, in Mart., Fl. Bras. 2^2: 122. 1877. Based on *T. racemosus* Desf. (Same as *T. racemosus* All.)

Nazia racemosa Kuntze, Rev. Gen. Pl. 2: 780. 1891. Based on *Cenchrus racemosus* L.

(120) TRICHACHNE Nees

(2) **Trichachne californica** (Benth.) Chase, Jour. Wash. Acad. Sci. 23: 455 1933. Based on *Panicum californicum* Benth.

Panicum californicum Benth., Bot. Voy. Sulph. 55. 1840. Bay of Magdalena, Baja California.

Panicum lachnanthum Torr., U.S. Rept. Expl. Miss. Pacif. 7^3: 21. 1856. Not *P. lachnanthum* Hochst., 1855. Burro Mountains, N.Mex.

Panicum saccharatum Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 2. 1866. Texas, *Buckley.*

Trichachne saccharata Nash, in Small, Fl. Southeast. U.S. 83. 1903. Based on *Panicum saccharatum* Buckl.

Valota saccharata Chase, Biol. Soc. Wash. Proc. 19: 188. 1906. Based on *Panicum saccharatum* Buckl.

Digitaria californica Henr., Blumea 1: 99. 1934. Based on *Panicum californicum* Benth.

(4) **Trichachne hitchcockii** (Chase) Chase, Jour. Wash. Acad. Sci. 23: 454. 1933. Based on *Valota hitchcockii* Chase.

Valota hitchcockii Chase, Biol. Soc. Wash. Proc. 24: 110. 1911. San Antonio, Tex., *Hitchcock* 5329.

Digitaria hitchcockii Stuck., Ann. Cons. Jard. Genève 17: 287. 1914. Based on *Valota hitchcockii* Chase.

(1) **Trichachne insularis** (L.) Nees, Agrost. Bras. 86. 1829. Based on *Andropogon insularis* L.

Andropogon insularis L., Syst. Nat. ed. 10. 2: 1304. 1759. Jamaica, *Sloane.*

Panicum lanatum Rottb., Act. Lit. Univ. Hafn. 1: 269. 1778. Dutch Guiana.
Milium villosum Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Based on *Andropogon insularis* L.
Milium hirsutum Beauv., Ess. Agrost. 13. pl. 5. f. 5. 1812. No locality cited.
Panicum leucophaeum H.B.K., Nov. Gen. and Sp. 1: 97. 1815. Venezuela and Colombia, *Humboldt* and *Bonpland*.
Panicum insulare G. Meyer, Prim. Fl. Esseq. 60. 1818. Based on *Andropogon insularis* L.
Saccharum polystachyum Sieb.; Kunth, Enum. Pl. 1: 124. 1833. Not *S. polystachyum* Swartz. As synonym of *Panicum leucophaeum* H.B.K.
Agrostis villosa Poir.; Steud., Nom. Bot. ed. 2. 1: 43. 1840. Not *A. villosa* Poir., 1786. As synonym of *Milium villosum* Swartz.
Panicum saccharoides A. Rich., in Sagra, Hist. Cuba 11: 306. 1850. Not *P. saccharoides* Trin., 1826. Cuba.
Panicum falsum Steud., Syn. Pl. Glum. 1: 67. 1854. Cuba.
Panicum duchaissingii Steud., Syn. Pl. Glum. 1: 93. 1854. Guadeloupe, *Duchaissing*.
Tricholaena insularis Griseb., Abhandl. Gesell. Wiss. Göttingen 7: 265. 1857. Based on *Andropogon insularis* L.
Digitaria leucophaea Stapf, in Dyer, Fl. Cap. 7: 382. 1898. Based on *Panicum leucophaeum* Swartz (error for H.B.K.).
Syntherisma insularis Millsp. and Chase, Field Mus. Bot. 1: 473. 1902. Based on *Andropogon insularis* L.
Valota insularis Chase, Biol. Soc. Wash. Proc. 19: 188. 1906. Based on *Andropogon insularis* L.
Digitaria insularis Mez; Ekman, Arkiv Bot. 13: 22. 1913. Based on *Andropogon insularis* L.
Andropogon fabricii Herzog; Henr., Med. Rijks Herb. Leiden 40: 44. 1921. Jamaica, *Swartz*. (Sterile specimen with large galls.)

(3) **Trichachne patens** Swallen, Amer. Jour. Bot. 19: 442. f. 5. 1932. Near Lake Mitchell, San Antonio, Tex., *Amer. Gr. Nat. Herb.* 294 (*Hitchcock* 5328).
Digitaria patens Henr., Blumea 1: 99. 1934. Based on *Trichachne patens* Swallen.

(103) TRICHLORIS Fourn.

(1) **Trichloris mendocina** (Phil.) Kurtz, Mem. Fac. Cienc. Exact. Univ. Córdoba 1896: 37. 1897. Based on *Chloris mendocina* Phil.
Chloris mendocina Phil., An. Univ. Chile 36: 208. 1870. Mendoza, Argentina [*Philippi*].
Trichloris blanchardiana Fourn.; Scribn., Bull. Torrey Bot. Club 9: 146. 1882. Tucson, Ariz., *Pringle*.
Chloridiopsis [error for *Chloropsis*] *blanchardiana* Gay; Scribn., Bull. Torrey Club 9: 146. 1882, as synonym of *Trichloris blanchardiana* Fourn.
Trichloris verticillata Fourn.; Vasey, Descr. Cat. Grasses U.S. 61. 1885, name only; U.S.Dept.Agr., Div. Bot. Bull. 12^2: pl. 25. 1891. Arizona [Tucson, *Pringle*].
Trichloris fasciculata Fourn., Mex. Pl. 2: 142. 1886. San Luis de Potosí, Mexico, *Virlet* 1440.
Chloropsis blanchardiana Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Trichloris blanchardiana* Hack. (error for Fourn.).
Chloropsis fasciculata Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Trichloris fasciculata* Fourn.
Chloropsis mendocina Kuntze, Rev. Gen. Pl. 3^2: 348. 1898. Based on *Chloris mendocina* Phil.
Trichloris mendocina forma *blanchardiana* Kurtz, Bol. Acad. Cienc. Córdoba 16: 270. 1900. Based on *Trichloris blanchardiana* Fourn.
Leptochloris greggii Munro; Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 7. 1901, as synonym of *Chloropsis mendocina* Kuntze.

(2) **Trichloris pluriflora** Fourn., Mex. Pl. 2: 142. 1886. Mexico, *Karwinsky;* Texas, between Loredo and Bejar [Bexar], *Berlandier* 1430.
Trichloris latifolia Vasey, U.S.Dept.Agr. Spec. Rept. 63: 32. 1883. Texas and New Mexico [*Wright* 763]. Name only.
Chloropsis pluriflora Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Trichloris pluriflora* Fourn.

(134) TRICHOLAENA Schrad.

(1) **Tricholaena rosea** Nees, "Cat. Sem. Hort. Vratisl. a. 1836"; Fl. Afr. Austr. 17. 1841. South Africa, *Drège.*

Panicum roseum Steud., Syn. Pl. Glum. 1: 92. 1854. Not *P. roseum* Willd. 1825. Based on *Tricholaena rosea* Nees.

Panicum teneriffae var. *rosea* F. M. Bailey, Queensl. Grass. 22. 1888. Based on *Tricholaena rosea* Nees.

Melinis rosea Hack., Oesterr. Bot. Ztschr. 51: 464. 1901. Based on *Tricholaena rosea* Nees.

Rhynchelytrum roseum Stapf and Hubb.; Bews, World's Grasses 223. 1929, basis not given; Prain, Fl. Trop. Afr. 9: 880. 1930. Based on *Tricholaena rosea* Nees.

(91) TRICHONEURA Anderss.

(1) **Trichoneura elegans** Swallen, Amer. Jour. Bot. 19: 439. f. 4. 1932. Devine, Tex., *Silveus* 343.

(31) TRIODIA R. Br.

(12) **Triodia albescens** Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12[2]: pl. 33. 1891. Texas [type, *Hall* 782] and New Mexico. *Tricuspis albescens* Munro is erroneously cited as synonym (see this name under *T. congesta*).

Sieglingia albescens Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Triodia albescens* Vasey.

Rhombolytrum albescens Nash, in Britton, Man. 129. 1901. Based on *Triodia albescens* Vasey.

Tridens albescens Woot. and Standl., N.Mex. Coll. Agr. Bull. 81: 129. 1912. Based on *Triodia albescens* Vasey.

(5) **Triodia buckleyana** (L. H. Dewey) Vasey; Hitchc., Jour. Wash. Acad. Sci. 23: 452. 1933. Based on *Sieglingia buckleyana* L. H. Dewey.

Sieglingia buckleyana L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 540. 1894. Southern Texas, *Buckley.*

Triodia buckleyana Vasey, Contrib. U.S. Natl. Herb. 2: 540. 1894, as synonym of *Sieglingia buckleyana* L. H. Dewey.

Tridens buckleyanus Nash, in Small, Fl. Southeast. U.S. 143. 1903. Southern Texas; *Triodia buckleyana* Vasey given as a synonym.

(4) **Triodia congesta** (L. H. Dewey) Bush, St. Louis Acad. Sci. Trans. 12: 67. pl. 10. 1902. Based on *Sieglingia congesta* L. H. Dewey.

Tricuspis albescens Munro; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 335. 1863. Name only, for *Drummond* 314, Texas.

Sieglingia congesta L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 538. 1894. Corpus Christi, Tex., *Nealley* 24.

Tricuspis congesta Heller, Cat. N.Amer. Pl. ed. 2. 28. 1900. Based on "*Triodia*" [error for *Sieglingia*] *congesta* L. H. Dewey.

Tridens congestus Nash, in Small, Fl. Southeast. U.S. 143. 1903. Based on *Sieglingia congesta* L. H. Dewey.

(6) **Triodia drummondii** Scribn. and Kearn., U.S.Dept.Agr., Div. Agrost. Bull. 4: 37. 1897. Jacksonville, "Fla." [Louisiana], *Drummond.*

Tridens drummondii Nash, in Small, Fl. Southeast. U.S. 143. 1903. Based on *Triodia drummondii* Scribn. and Kearn.

(14) **Triodia elongata** (Buckl.) Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 17 (ed. 2): 210. f. 506. 1901. Based on *Uralepis elongata* Buckl.

Uralepis elongata Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1863. Northern Texas.

Triodia trinerviglumis Benth.; Vasey, U.S.Dept.Agr. Spec. Rept. 63: 35. 1883, name only, with *Tricuspis trinerviglumis* Munro, also name only, as synonym. Texas. Described in Vasey, U.S.Dept.Agr., Div. Bot. Bull. 12[2]: pl. 40. 1891. Texas to Arizona, northward to Colorado.

Tricuspis trinerviglumis Munro; Vasey, U.S. Dept. Agr., Spec. Rept. 63: 35. 1883, as synonym of *Triodia trinerviglumis* Benth.

Sieglingia trinerviglumis Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Tricuspis trinerviglumis* "Buckl." (error for Munro).

Sieglingia elongata Nash, in Britt. and Brown, Illustr. Fl. 3: 504. 1898. Based on *Uralepis elongata* Buckl.

Tricuspis elongata Heller, Cat. N.Amer. Pl. ed. 2. 28. 1900. Based on "*Triodia*" [error for *Uralepis*] *elongata* Buckl.

Tridens elongatus Nash, in Small, Fl. Southeast. U.S. 143. 1903. Based on *Uralepis elongata* Buckl.

(8) **Triodia eragrostoides** Vasey and Scribn., Contrib. U.S. Natl. Herb. 1: 58. 1890. Texas, *Nealley.*

Sieglingia eragrostoides L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 539. 1894. Based on *Triodia eragrostoides* Vasey and Scribn.

Sieglingia eragrostoides var. *scabra* Vasey; Beal, Grasses N.Amer. 2: 465. 1896. Texas, *Nealley* [probably no. 96].

Triodia eragrostoides var. *scabra* Bush, Acad. Sci. St. Louis Trans. 12: 71. 1902. Based on *Sieglingia eragrostoides* var. *scabra* Vasey.

Tridens eragrostoides Nash, in Small, Fl. Southeast. U.S. 142. 1903. Based on *Triodia eragrostoides* Vasey and Scribn.

(9) **Triodia flava** (L.) Smyth, Kans. Acad. Sci. Trans. 25: 95. 1913. Based on *Poa flava* L.

Poa flava L., Sp. Pl. 68. 1753. Virginia.

?*Poa laxa* Lam., Tabl. Encycl. 1: 183. 1791. Not *P. laxa* Haenke, 1791. Virginia.

Poa sesleroides Michx., Fl. Bor. Amer. 1: 68. 1803. Not *P. seslerioides* All., 1785. Illinois and the mountains of Carolina [type], *Michaux.*

?*Poa subverticillata* Pers., Syn. Pl. 1: 92. 1805. Based on *P. laxa* Lam.

Tricuspis caroliniana Beauv., Ess. Agrost. 179. pl. 3. f. 29, pl. 15. f. 10. 1812. South Carolina.

Tricuspis novae-boracensis Beauv., Ess. Agrost. 77, 179. 1812. Name only. New York, *Delille.*

Poa caerulescens Michx.; Beauv., Ess. Agrost. 77. 1812, name only; Kunth, Rév. Gram. 1: 108. 1829, as synonym of *Uralepis cuprea* Kunth.

Festuca quadridens Poir., in Lam., Encycl. Sup. 2: 640. 1812. Carolina, *Bosc.*

Triodia cuprea Jacq., Eclog. Gram. 2: 21. pl. 16. 1814. Grown in botanic garden, source unknown.

Poa quinquefida Pursh, Fl. Amer. Sept. 1: 81. 1814. New England to Carolina.

?*Panicum festucoides* Poir., in Lam., Encycl. Sup. 4: 283. 1816. East Indies, Desvaux, but Desvaux later (see *Triodia festucoides* below) corrects this to North America.

Poa arundinacea Poir., in Lam., Encycl. Sup. 4: 329. 1816. Based on *P. sesleroides* Michx.

Tridens quinquefida Roem. and Schult., Syst. Veg. 2: 599. 1817. Based on *Poa quinquefida* Pursh.

Windsoria poaeformis Nutt., Gen. Pl. 1: 70. 1818. Based on *Poa sesleroides* Michx.

Tricuspis sesleroides Torr., Fl. North. and Mid. U.S. 118. 1823. Based on *Poa sesleroides* Michx.

Cynodon carolinianus Raspail, Ann. Sci. Nat., Bot. 5: 302. 1825. Based on *Tricuspis caroliniana* Beauv.

Uralepis cuprea Kunth, Rév. Gram. 1: 108. 1829. Based on *Triodia cuprea* Jacq.

Eragrostis tricuspis Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 414. 1830. Based on *Tricuspis caroliniana* Beauv.

Tricuspis quinquefida Beauv.; Don, Loud. Hort. Brit. 31. 1830. Based on *Poa caerulescens* Michx.

?*Triodia festucoides* Desv., Opusc. 98. 1831. North America, *Panicum festucoides* Desv., in Poir., cited as synonym.

Triodia caerulescens Desv., Opusc. 99. 1831. Based on *Poa caerulescens* Michx.

Triodia novaeboracensis Desv., Opusc. 99. 1831. Based on *Tricuspis novaeboracensis* Beauv.

Uralepis tricuspis Steud., Nom. Bot. ed. 2. 1: 564. 1840. Based on *Eragrostis tricuspis* Trin.

Festuca purpurea Schreb.; Steud., Nom. Bot. ed. 2. 1: 632. 1840, as synonym of *Uralepis cuprea* Kunth.

Tricuspis sesleroides var. *flexuosa* Wood, Amer. Bot. and Flor. pt. 2: 398. 1870. Pennsylvania.

Festuca flava F. Muell., Sel. Pl. Indust. Cult. 87. 1876. Based on *Poa flava* "Gronov" [L.].

Triodia sesleroides Benth.; Vasey, U.S. Dept. Agr. Spec. Rept. 63: 35. 1883. Based on *Tricuspis sesleroides* Torr.

Sieglingia flava Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Poa flava* L.

Sieglingia cuprea Millsp., Fl. W.Va. 471. 1892. Presumably based on *Triodia cuprea* Jacq.

Sieglingia sesleroides Scribn., Mem. Torrey Bot. Club 5: 48. 1894. Based on *Poa sesleroides* Michx.

Sieglingia sesleroides var. *intermedia* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 539. 1894. Texas to Oklahoma [*Sheldon* in 1891].

Sieglingia chapmani Small, Bull. Torrey Bot. Club 22: 365. 1895. Florida, *Chapman.*

Triodia sesleroides var. *aristata* Scribn. and Ball, U.S.Dept.Agr., Div. Agrost. Bull. 24: 45. 1901. Clarcona, Fla., *Meislahn* 90.

Triodia chapmani Bush, St. Louis Acad. Sci. Trans. 12: 74. 1902. Based on *Sieglingia chapmani* Small.

Tridens sesleroides Nash, in Small, Fl. Southeast. U.S. 142. 1903. Based on *Poa sesleroides* Michx.

Tridens flavus Hitchc., Rhodora 8: 210. 1906. Based on *Poa flava* L.

Tricuspis flava F. T. Hubb., Rhodora 14: 186. 1912. Based on *Poa flava* L.

Eragrostis arundinacea Jedw., Bot. Archiv Mez 5: 192. 1924. Texas.

(2) **Triodia grandiflora** Vasey, Contrib. U.S. Natl. Herb. 1: 59. 1890. Chenate Mountains, Presidio County, Tex., *Nealley* 823.

Triodia nealleyi Vasey, Bull. Torrey Bot. Club. 15: 49. 1888, name only; U.S.Dept.Agr., Div. Bot. Bull. 12^2: pl. 36. 1891. Western Texas, *Nealley.*

Sieglingia nealleyi L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 538. 1894. Based on *Triodia nealleyi* Vasey.

Sieglingia avenacea var. *grandiflora* L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 538. 1894. Based on *Triodia grandiflora* Vasey.

Sieglingia grandiflora Beal, Grasses N.Amer. 2: 471. 1896. Based on *Triodia grandiflora* Vasey.

Tricuspis nealleyi Heller, Cat. N.Amer. Pl. ed. 2. 28. 1900. Presumably based on *Triodia nealleyi* Vasey.

Tridens nealleyi Woot. and Standl., N.Mex. Coll. Agr. Bull. 81: 129. 1912. Based on *Triodia nealleyi* Vasey.

Tridens grandiflorus Woot. and Standl., N.Mex. Coll. Agr. Bull. 81: 129. 1912. Based on *Triodia grandiflora* Vasey.

This species has been referred to *Triodia avenacea* H.B.K., a Mexican species not known from the United States.

(7) **Triodia langloisii** (Nash) Bush, St. Louis Acad. Sci. Trans. 12: 72. 1902. Based on *Tricuspis langloisii* Nash.

Poa ambigua Ell., Bot. S.C. and Ga. 1: 165. 1816. Not *Triodia ambigua* R. Br., 1810. South Carolina and Georgia.

Windsoria ambigua Nutt., Gen. Pl. 1: 70. 1818. Based on *Poa ambigua* Ell.

Tridens ambiguus Schult., Mant. 2: 333. 1824. Based on *Poa ambigua* Ell.

Uralepis ambigua Kunth, Rév. Gram. 1: 108. 1829. Based on *Poa ambigua* Ell.

Tricuspis ambigua Chapm., Fl. South. U.S. 559. 1860. Based on *Poa ambigua* Ell.

Triodia ambigua Benth.; Vasey, U.S. Dept. Agr. Spec. Rept. 63: 35. 1883. Based on *Tricuspis ambigua* Chapm.

Sieglingia ambigua Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Poa ambigua* Ell.

Tricuspis langloisii Nash, Bull. N.Y. Bot. Gard. 1: 293. 1899. Louisiana, *Langlois.*

Triodia elliottii Bush, St. Louis Acad. Sci. Trans. 12: 73. 1902. Based on *Poa ambigua* Ell.

Tridens langloisii Nash, in Small, Fl. Southeast. U.S. 142. 1903. Based on *Tricuspis langloisii* Nash.

(13) **Triodia mutica** (Torr.) Scribn., Bull. Torrey Bot. Club 10: 30. 1883. Based on *Tricuspis mutica* Torr.

Tricuspis mutica Torr., U.S. Rept. Expl. Miss. Pacif. 4: 156. 1857. Laguna Colorado, N.Mex., [*Bigelow*].

Uralepis pilosa Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 95. 1863. Not *U. pilosa* Buckl., op. cit. 94. "Northern Texas" cited, but the type is from western Texas, collected by Wright.

Uralepis mutica Fourn.; Hemsl., Biol. Centr. Amer. Bot. 3: 569. 1885, as synonym of *Triodia mutica* Benth. (*U. mutica* Fourn., Mex. Pl. 2: 110. 1886, based on *Liebmann* 611, is *Poa alpina.*)

Sieglingia mutica Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Tricuspis mutica* Torr.

Tridens muticus Nash., in Small, Fl. Southeast. U.S. 143. 1903. Based on *Tricuspis mutica* Torr.

(8) **Triodia pilosa** (Buckl.) Merr., U.S.Dept.Agr., Div. Agrost. Circ. 32: 9. 1901. Based on *Uralepis pilosa* Buckl.

Uralepis pilosa Buckl., Acad. Nat. Sci. Phila. Proc. 1862. 94. 1863. Middle Texas, [*Buckley*].
Tricuspis acuminata Munro; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 335. 1863, as synonym of *Uralepis pilosa* Buckl.
Triodia acuminata Benth.; Vasey, U.S.Dept.Agr. Spec. Rept. 63: 35. 1883, name only, with *Tricupis acuminata* Munro given as synonym; Vasey, U.S. Dept.Agr., Div. Bot. Bull. 12^3: pl. 32. 1891. Texas [type, Austin, *Hall* 779] to Arizona and Mexico.
Sieglingia acuminata Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Triodia acuminata* Vasey.
Sieglingia pilosa Nash, in Britt. and Brown, Illustr. Fl. 3: 504. 1898. Based on *Uralepis pilosa* Buckl.
Tricuspis pilosa Heller, Cat. N.Amer. Pl. ed. 2: 28. 1900. Presumably based on *Uralepis pilosa* Buckl.
Erioneuron pilosum Nash, in Small, Fl. Southeast. U.S. 144. 1903. Based on *Uralepis pilosa* Buckl.
Tridens pilosus Hitchc., Contrib. U.S. Natl. Herb. 17: 357. 1913. Based on *Uralepis pilosa* Buckl.

(1) **Triodia pulchella** H.B.K., Nov. Gen. and Sp. 1: 155. pl. 47. 1816. Mexico, *Humboldt* and *Bonpland*.
Koeleria pulchella Spreng., Syst. Veg. 1: 332. 1825. Based on *Triodia pulchella* H.B.K.
Uralepis pulchella Kunth, Rév. Gram. 1: 108. 1829. Based on *Triodia pulchella* H.B.K.
Dasyochloa pulchella Willd.; Steud., Nom. Bot. ed. 2. 1: 484. 1840, as synonym of *Uralepis pulchella* Kunth; Rydb., Fl. Rocky Mount. 67. 1917. Based on *Triodia pulchella* H.B.K.
Tricuspis pulchella Torr., U.S. Rept. Expl. Miss. Pacif. 4: 156. 1857. Based on "*Trichodia*" [error for *Triodia*] *pulchella* H.B.K.
Trichodiclida prolifera Cervant., Naturaleza 1870: 346. 1870. Near Mexico City.
Sieglingia pulchella Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Triodia pulchella* H.B.K.
Sieglingia pulchella var. *parviflora* Vasey; Beal, Grasses N.Amer. 2: 468. 1896. Southern California, *Orcutt*.
Tridens pulchellus Hitchc., in Jepson, Fl. Calif. 1: 141. 1912. Based on *Triodia pulchella* H.B.K.

(11) **Triodia stricta** (Nutt.) Benth.; Vasey, U.S. Dept. Agr. Spec. Rept. 63: 35. 1883. Based on "*Tricuspis*" [error for *Windsoria*] *stricta* Nutt.
Windsoria stricta Nutt., Amer. Phil. Soc. Trans. (n.s.) 5: 147. 1837. Arkansas (probably Arkansas Post), *Nuttall*.
Tricuspis stricta Wood, Class-book 792. 1861. Based on *Windsoria stricta* Nutt.
Uralepis densiflora Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 94. 1863. Middle Texas, [*Buckley*].
Sieglingia stricta Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Windsoria stricta* Nutt.
Tridens strictus Nash, in Small, Fl. Southeast. U.S. 143. 1903. Based on *Windsoria stricta* Nutt.

(10) **Triodia texana** S. Wats., Amer. Acad. Sci. Proc. 18: 180. 1883. Coahuila, Mexico; western Texas and New Mexico, *Wright* 776, 777, and 2045 [error for 2055, type, from Texas].
Tricuspis texana Thurb.; S. Wats., Amer. Acad. Sci. Proc. 18: 180. 1883, as synonym of *Triodia texana* S. Wats.
Sieglingia texana Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Triodia texana* S. Wats.
Tridens texanus Nash, in Small, Fl. Southeast. U.S. 142. 1903. Based on *Triodia texana* Thurb. (error for S. Wats.).

(32) TRIPLASIS Beauv.

(2) **Triplasis americana** Beauv., Ess. Agrost. 81. pl. 16. f. 10. 1812. United States, *Delille*.
Uralepsis cornuta Ell., Bot. S.C. and Ga. 1: 580. 1821. South Carolina and Georgia.
Tricuspis cornuta A. Gray, Man. 590. 1848. Based on *Uralepsis cornuta* Ell.
Triplasis cornuta Benth.; Jacks., Ind. Kew. 2: 1121. 1895, as synonym of *Triplasis americana* Beauv.

Sieglingia americana Beal, Grasses N.Amer. 2: 466. 1896. Based on *Triplasis americana* Beauv.

(1) **Triplasis purpurea** (Walt.) Chapm., Fl. South. U.S. 560. 1860. Based on *Aira purpurea* Walt.
Aira purpurea Walt., Fl. Carol. 78. 1788. South Carolina.
Festuca brevifolia Muhl., Descr. Gram. 167. 1817. Delaware, Georgia, and New York.
Diplocea barbata Raf., Amer. Jour. Sci. 1: 252. 1818. Carolina; Long Island.
Uralepsis purpurea Nutt., Gen. Pl. 1: 62. 1818. Based on *Aira purpurea* Walt.
Uralepsis aristulata Nutt., Gen. Pl. 1: 63. 1818. Wilmington, Del., *Baldwin.*
Glyceria ? *brevifolia* Schult., Mant. 2: 387. 1824. Based on *Festuca brevifolia* Muhl.
Tricuspis purpurea A. Gray, Man. 589. 1848. Based on *Aira purpurea* Walt.
Merisachne drummondii Steud., Syn. Pl. Glum. 1: 117. 1854. Texas, *Drummond* 330.
Festuca caroliniana Steud., Syn. Pl. Glum. 1: 312. 1854. Carolina, *Bosc.*
Festuca purpurea F. Muell., Sel. Pl. Indust. Cult. 88. 1876. Based on *Uralepsis purpurea* Nutt.
Triplasis sparsiflora Chapm., Bot. Gaz. 3: 19. 1878. Punta Rassa, Fla., [*Chapman*, specimen affected by fungus.]
Sieglingia purpurea Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Aira purpurea* Walt.
Panicularia brevifolia Porter, Bull. Torrey Bot. Club 20: 205. 1893. Based on *Festuca brevifolia* Muhl.
Triplasis intermedia Nash, Bull. Torrey Bot. Club 25: 564. 1898. Tampa, Fla., *Nash* 2426.
Triplasis floridana Gandog., Bull. Soc. Bot. France 66^7: 303. 1920. Punta Rassa, Fla., *Hitchcock* 533.
Triplasis glabra Gandog., Bull. Soc. Bot. France 66^7: 303. 1920. Rhode Island and Florida.
Triodia purpurea Smyth, Kans. Acad. Sci. Trans. 25: 95. 1913. Based on *Triplasis purpurea* Chapm.

(92) TRIPOGON Roth

(1) **Tripogon spicatus** (Nees) Ekman, Arkiv Bot. 11^4: 36. 1912. Based on *Bromus spicatus* Nees.
Bromus spicatus Nees, Agrost. Bras. 471. 1829. Piauhy, Brazil.
Diplachne spicata Doell, in Mart., Fl. Bras. 2^3: 159. pl. 28. f. 2. 1878. Based on *Bromus spicatus* Nees.
Triodia schaffneri S. Wats., Amer. Acad. Sci. Proc. 18: 181. 1883. San Luis Potosí, Mexico, *Schaffner* 1077.
Diplachne reverchoni Vasey, Bull. Torrey Bot. Club 13: 118. 1886. Llano County, Tex., *Reverchon.*
Leptochloa spicata Scribn., Acad. Nat. Sci. Phila. Proc. 1891: 304. 1891. Based on *Diplachne spicata* Doell.
Sieglingia schaffneri Kuntze, Rev. Gen. Pl. 2: 789. 1891. Based on *Triodia schaffneri* S. Wats.
Rabdochloa spicata Kuntze; Stuck., An. Mus. Nac. Buenos Aires 11: 121. 1904. Based on *Bromus spicatus* Nees.
Sieglingia spicata Kuntze; Stuck., An. Mus. Nac.Buenos Aires 11: 128. 1904. Based on *Bromus spicatus* Nees.

(157) TRIPSACUM L.

(1) **Tripsacum dactyloides** (L.) L., Syst. Nat. ed. 10. 2: 1261. 1759. Based on *Coix dactyloides* L.
Coix dactyloides L., Sp. Pl. 972. 1753. America.
Coix angulatis Mill., Gard. Dict. ed. 8. Coix no. 2. 1768. North America.
Ischaemun glabrum Walt., Fl. Carol. 249. 1788. South Carolina.
Tripsacum monostachyum Willd., Sp. Pl. 4: 202. 1805. South Carolina.
Tripsacum dactyloides var. *monostachyon* Eaton and Wright, N.Amer. Bot. ed. 8. 461. 1840. Connecticut. Wood, Class-book 453. 1845. Gray, Man. Bot. 616. 1848. No basis given.
Dactylodes angulatum Kuntze, Rev. Gen. Pl. 2: 773. 1891. Based on *Coix angulatis* Mill.

Tripsacum dactyloides var. *monostachyum* Vasey, Contrib U.S. Natl. Herb. 3: 6. 1892. Based on *T. monostachyum* Willd.
Dactylodes dactylodes Kuntze, Rev. Gen. Pl. 3²: 349. 1898. Based on *Tripsacum dactyloides* L.

(2) **Tripsacum floridanum** Porter; Vasey, Contrib. U.S. Natl. Herb. 3: 6. 1892. Florida, *Garber*.
Tripsacum dactyloides var. *floridanum* Beal, Grasses N.Amer. 2: 19. 1896. Based on *T. floridanum* Porter.

(3) **Tripsacum lanceolatum** Rupr.; Fourn., Mex. Pl. 2: 68. 1886. Aguas Calientes, Mexico, *Hartweg* 252.
Tripsacum acutiflorum Fourn., Bull. Soc. Bot. Belg. 15: 466. 1876, name only; Nash, N.Amer. Fl. 17: 81. 1909. Same type as *T. lanceolatum* Rupr.
Tripsacum lemmoni Vasey, Contrib. U.S. Natl. Herb. 3: 6. 1892. Huachuca Mountains, Ariz., *Lemmon* [2932].
Tripsacum dactyloides var. *lemmoni* Beal, Grasses N.Amer. 2: 19. 1896. Based on *T. lemmoni* Vasey.
Tripsacum dactyloides hispidum Hitchc., Bot. Gaz. 41: 295. 1906. Las Canóas, Mexico, *Pringle* 3811.

(54) TRISETUM Pers.

Trisetum aureum (Ten.) Ten., Fl. Napol. 2: 378. 1820. Based on *Koeleria aurea* Ten.
Koeleria aurea Ten., Cors. Bot. Lez. 1: 58. 1806. Europe.

(6) **Trisetum canescens** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1863. Columbia Plains, Oreg., *Nuttall*.
Trisetum elatum Nutt.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1862: 337. 1863, as synonym of *T. canescens* Buckl.
Trisetum cernuum var. *canescens* Beal, Grasses N.Amer. 2: 380. 1896. Based on *T. canescens* Buckl.
Trisetum canescens forma *tonsum* Louis-Marie, Rhodora 30: 216. 1928. Trinity County, Calif., *Yates* 522.
Trisetum canescens forma *velutinum* Louis-Marie, Rhodora 30: 216. 1928. Lassens Peak, Calif., *Austin* in 1879.
Trisetum projectum Louis-Marie, Rhodora 30: 217. 1928. Fresno County, Calif., *Hall* and *Chandler* 359.

(4) **Trisetum cernuum** Trin., Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 61. 1830. Sitka, Alaska.
Avena nutkaensis Presl, Rel. Haenk. 1: 254. 1830. Nootka Sound, Vancouver Island, *Haenke*.
Avena cernua Kunth, Rév. Gram. 1: Sup. XXVI. 1830. Based on *Trisetum cernuum* Trin.
Trisetum sandbergii Beal, Grasses N.Amer. 2: 378. 1896. Mount Stuart, Wash., *Sandberg* and *Leiberg* 823.
Trisetum nutkaense Scribn. and Merr.; Davy, Univ. Calif. Pubs., Bot. 1: 63. 1902. Based on *Avena nutkaensis* Presl.
Trisetum cernuum var. *luxurians* Louis-Marie, Rhodora 30: 213. 1928. Seaside, Oreg., *Shear* and *Scribner* 1705.
Trisetum cernuum var. *luxurians* forma *pubescens* Louis-Marie, Rhodora 30: 213. 1928. Eureka, Calif.
Trisetum cernuum var. *sandbergii* Louis-Marie, Rhodora 30: 214. 1928. Based on *T. sandbergii* Beal.

(8) **Trisetum flavescens** (L.) Beauv., Ess. Agrost. 88, 153. pl. 18. f. 1. 1812. Based on *Avena flavescens* L.
Avena flavescens L., Sp. Pl. 80. 1753. Europe.
Trisetum pratense Pers., Syn. Pl. 1: 97. 1805. Europe.
Trisetaria flavescens Baumg., Enum. Stirp. Transsilv. 3: 263. 1816. Based on *Avena flavescens* Schreb. (error for L.).
Rebentischia flavescens Opiz, Lotos 4: 104. 1854, as synonym of *Trisetum flavescens* Beauv.

(10) **Trisetum interruptum** Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 100. 1863. Middle Texas [*Buckley*].
?*Calamagrostis longirostris* Buckl., Prel. Rept. Geol. Agr. Survey Tex. App. 2. 1866. Texas.
Trisetum hallii Scribn., Bull. Torrey Bot. Club 11: 6. 1884. Texas, *Hall* 799 in part.

Sphenopholis interrupta Scribn., Rhodora 8: 145. 1906. Based on *Trisetum interruptum* Buckl.

Sphenopholis hallii Scribn., Rhodora 8: 146. 1906. Based on *Trisetum hallii* Scribn.

Trisetum interruptum hallii Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *T. hallii* Buckl.

(1) **Trisetum melicoides** (Michx.) Scribn., Bot. Gaz. 9: 169. 1884. Based on *Aira melicoides* Michx.

Aira melicoides Michx., Fl. Bor. Amer. 1: 62. 1803. Canada.

?*Arundo airoides* Poir., in Lam., Encycl. 6: 270. 1804. North America, *Michaux.*

Graphephorum melicoideum Desv., Nouv. Bull. Soc. Philom. Paris 2: 189. 1810. Based on *Aira melicoides* Michx.

?*Deyeuxia airoides* Beauv., Ess. Agrost. 44, 152, 160. 1812. Based on *Arundo airoides* Michx. [error for Poir.].

Poa melicoides Nutt., Gen. Pl. 1: 68. 1818. Based on *Aira melicoides* Michx.

Triodia melicoides Spreng., Syst. Veg. 1: 331. 1825. Based on *Aira melicoides* Michx.

?*Agrostis airoides* Raspail, Ann. Sci. Nat., Bot. 5: 449. 1825. Based on *Deyeuxia airoides* Beauv.

?*Calamagrostis airoides* Steud., Nom. Bot. ed. 2. 1: 249. 1840. Based on *Arundo airoides* Poir.

Dupontia cooleyi A. Gray, Man. ed. 2. 556. 1856. Washington, Mich., [*Cooley*].

Graphephorum melicoides var. *major* A. Gray, Amer. Acad. Sci. Proc. 5: 191. 1861. Based on *Dupontia cooleyi* A Gray.

Graphephorum melicoideum cooleyi Scribn., Mem. Torrey Bot. Club 5: 53. 1894. Based on *Dupontia cooleyi* A. Gray.

Trisetum melicoideum cooleyi Scribn., Rhodora 8: 87. 1906. Based on *Dupontia cooleyi* A. Gray.

Trisetum melicoides var. *majus* Hitchc., in Robinson, Rhodora 10: 65. 1908. Based on *Graphephorum melicoides* var. *major* A. Gray.

Graphephorum cooleyi Farwell, Mich. Acad. Sci. Papers 1: 88. 1921. Based on *Dupontia cooleyi* A. Gray.

(7) **Trisetum montanum** Vasey, Bull. Torrey Bot. Club 13: 118. 1886. No locality cited. [Type, Las Vegas, N.Mex., *G. R. Vasey* in 1881.]

Trisetum argenteum Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 49. f. 8. 1898. Not *T. argenteum* Roem. and Schult. Silverton, Colo., *Shear* 1214.

Trisetum shearii Scribn., U.S.Dept.Agr., Div. Agrost. Circ. 30: 8. 1901. Based on *T. argenteum* Scribn.

Graphephorum shearii Rydb., Bull. Torrey Bot. Club 32: 602. 1905. Based on *Trisetum shearii* Scribn.

Trisetum canescens var. *montanum* Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *T. montanum* Vasey.

Trisetum montanum var. *pilosum* Louis-Marie, Rhodora 30: 212. 1928. Caroles, N.Mex., *Standley* 4536.

Trisetum montanum var. *shearii* Louis-Marie, Rhodora 30: 213. 1928. Based on *Trisetum shearii* Scribn.

(3) **Trisetum orthochaetum** Hitchc., Amer. Jour. Bot. 21: 134. f. 3. 1934. Lolo Hot Springs, Bitterroot Mountains, Mont., *Chase* 5129.

(9) **Trisetum pennsylvanicum** (L.) Beauv.; Roem. and Schult., Syst. Veg. 2: 658. 1817. Based on *Avena pennsylvanica* L.

Avena pennsylvanica L., Sp. Pl. 79. 1753. Pennsylvania, *Kalm.*

?*Avena caroliniana* Walt., Fl. Carol. 81. 1788. South Carolina.

Avena palustris Michx., Fl. Bor. Amer. 1: 72. 1803. Carolina and Georgia, *Michaux.*

Aira pallens var. *aristata* Muhl.; Ell., Bot. S.C. and Ga. 1: 151. 1816. South Carolina.

Avena pennsylvanica Muhl., Descr. Gram. 185. 1817. Pennsylvania and North Carolina. No authority cited but the Muhlenberg specimen belongs to the Linnaean species.

Trisetum palustre Torr., Fl. North. and Mid. U.S. 126. 1823. Based on *Avena palustris* Michx.

Arrhenatherum pennsylvanicum Torr., Fl. North. and Mid. U.S. 1: 130. 1823. Based on *Avena pennsylvanica* L.

?*Arrhenatherum kentuckense* Torr.; Steud., Nom. Bot. ed. 2. 1: 135. 1840. North America. Name only. "*Avena pennsylvanica* Muhl." doubtfully cited as synonym.

Trisetum ludovicianum Vasey, Bull. Torrey Bot. Club 12: 6. 1885. Pointe à la Hache, La., *Langlois.*

Sphenopholis palustris Scribn., Rhodora 8: 145. 1906. Based on *Avena palustris* Michx.

Sphenopholis palustris flexuosa Scribn., Rhodora 8: 143, 145. 1906. Wilmington, Del., *Commons* 274.

Sphenopholis palustris var. *flexuosa* Scribn.; Robinson, Rhodora 10: 65. 1908. Based on *S. palustris flexuosa* Scribn.

Sphenopholis pennsylvanica Hitchc., Amer. Jour. Bot. 2: 304. 1915. Based on *Avena pennsylvanica* L.

Sphenopholis pennsylvanica var. *flexuosa* F. T. Hubb., Rhodora 18: 234. 1916. Based on *S. palustris flexuosa* Scribn.

The plant from Hunting Creek, Va., discussed by Vasey (Bot. Gaz. 9: 165. 1884) as a hybrid between *Trisetum palustre* and *Eatonia pennsylvanica*, is an exceptional specimen of *Trisetum pennsylvanicum* (L.) Beauv. with short-awned and awnless spikelets.

(5) **Trisetum spicatum** (L.) Richt., Pl. Eur. 1: 59. 1890. Based on *Aira spicata* L., Sp. Pl. 64. 1753.

Aira spicata L., Sp. Pl. 64. 1753.[32] Lapland.

Aira subspicata L., Syst. Nat. ed. 10. 2: 873. 1759. Based on *A. spicata* L. (Sp. Pl. 64. 1753), the diagnosis copied.

Avena airoides Koel., Descr. Gram. 298. 1802. Based on *Aira subspicata* L.

Avena mollis Michx., Fl. Bor. Amer. 1: 72. 1803. Canada. Not *Avena mollis* Salisb., 1796, nor Koel., 1802.

Avena subspicata Clairv., Man. Herbor. 17. 1811. Based on a phrase name in Haller which refers to *Aira spicata* L.

Trisetum subspicatum Beauv., Ess. Agrost. 88, 149. 1812. Based on *Aira subspicata* L.

?*Melica triflora* Bigel., New England Jour. Med. and Surg. 5: 334. 1816. Mount Washington, N.H., *Boott.*

Trisetaria airoides Baumg., Enum. Stirp. Transsilv. 3: 265. 1816. Based on *Avena airoides* Koel.

Trisetum airoides Beauv.; Roem. and Schult., Syst. Veg. 2: 666. 1817. Based on *Avena airoides* Koel.

Trisetum molle Kunth, Rév. Gram. 1: 101. 1829. Based on *Avena mollis* Michx.

Koeleria subspicata Reichenb., Fl. Germ. 49. 1830. Based on *Aira subspicata* L.

Koeleria cancscens Torr., in Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2[1]: 13. 1836, as synonym of *Trisetum molle* Kunth.

Trisetum subspicatum var. *molle* A. Gray, Man. ed. 2. 572. 1856. Based on *Avena mollis* Michx.

Koeleria spicata Reichenb.; Willk. and Lange, Prodr. Fl. Hisp. 1: 72. 1861, as synonym of *Trisetum subspicatum* Beauv.

Rupestrina pubescens Provancher, Fl. Canad. 689. 1862. Based on *Avena mollis* Michx.

Trisetum spicatum var. *molle* Beal, Grasses N.Amer. 2: 377. 1896. Based on *Avena mollis* Michx.

Trisetum brittonii Nash, Bull. N.Y. Bot. Gard. 1: 437. 1900. Marquette, Mich., *Britton* in 1883.

Trisetum congdoni Scribn. and Merr., Bull. Torrey Bot. Club 29: 470. 1902. Mariposa County, Calif., *Congdon.* (*T. sesquiflorum* Trin., to which *T. congdoni* has been referred, is a distinct Alaskan species.)

Trisetum americanum Gandog., Bull. Soc. Bot. France 49: 182. 1902. Colorado; Idaho.

Trisetum majus Rydb., Colo. Agr. Expt. Sta. Bull. 100: 34. 1906. "*T. subspicatum major* Vasey", an unpublished name, cited as basis. A tall specimen collected by Vasey, Pen Gulch, Colo., in 1884 and marked "var. *major* Vasey" in his script is taken as type. No description by Rydberg except the distinctions given in the key.

Avena spicata Fedtsch., Act. Hort. Petrop. 28: 76. 1908. Not *A. spicata* L. Based on *Aira spicata* L.

Trisetum spicatum var. *pilosiglume* Fernald, Rhodora 18: 195. 1916. Newfoundland, *Fernald, Wiegand,* and *Bartram* 4593.

[32] On page 63 of this work is another *Aira spicata* L. In the errata at the end of the second volume of the Species Plantarum (issued a few months after the first volume) Linnaeus changes *A. spicata* of page 63 to *A. indica* (now referred to *Sacciolepis indica* (L.) Chase).

Trisetum spicatum congdoni Hitchc., Biol. Soc. Wash. Proc. 41: 160. 1928. Based on *Trisetum congdoni* Scribn. and Merr.
Trisetum spicatum var. *brittonii* Louis-Marie, Rhodora 30: 239. 1928. Based on *T. brittonii* Nash.

(2) **Trisetum wolfii** Vasey, U.S. Dept. Agr. Monthly Rept. Feb. Mar. 156. 1874. Twin Lakes, Colo., *Wolf.*
Trisetum subspicatum var. *muticum* Boland., in S. Wats., Bot. Calif. 2: 296. 1880. Upper Tuolumne, Calif., *Bolander* 5019.
Trisetum brandegei Scribn., Bull. Torrey Bot. Club 10: 64. 1883. Cascade Mountains, *Brandegee* and *Tweedy* in 1882.
Graphephorum wolfii Vasey; Coult. Man. Rocky Mount. 423. 1885. Based on *Trisetum wolfii* Vasey.
Trisetum muticum Scribn., U.S.Dept.Agr., Div. Agrost. Bull. 11: 50. f. 10. 1898. Based on *Trisetum subspicatum* var. *muticum* Boland.
Graphephorum muticum Heller, Cat. N.Amer. Pl. ed. 2. 31. 1900. Presumably based on *Trisetum subspicatum* var. *muticum* Boland.
Trisetum wolfii muticum Scribn., Rhodora 8: 88. 1906. Based on *T. subspicatum* var. *muticum* Thurb. (error for Boland.).
Graphephorum brandegei Rydb., Fl. Rocky Mount. 61. 1917. Based on *Trisetum brandegei* Scribn.
Trisetum wolfii var. *brandegei* Louis-Marie, Rhodora 30: 241. 1928. Based on *T. brandegei* Scribn.
Trisetum wolfii var. *brandegei* forma *muticum* Louis-Marie, Rhodora 30: 241. 1928. Based on *T. wolfii muticum* Scribn.

(40) TRITICUM L.

(1) **Triticum aestivum** L., Sp. Pl. 85. 1753. Cultivated in Europe.
Triticum hybernum L., Sp. Pl. 86. 1753. Cultivated in Europe.
Triticum compositum L., Syst. Veg. ed. 13. 108. 1774. Egypt. Form with branched spike.
Triticum sativum Lam., Fl. Franç. 3: 625. 1778. Cultivated in Europe.
Triticum vulgare Vill., Hist. Pl. Dauph. 2: 153. 1787. Cultivated in Europe.
Triticum vulgare var. *aestivum* Spenner, Fl. Friburg. 1: 163. 1825. Based on *T. aestivum* L.
Triticum sativum var. *aestivum* Wood, Class-book ed. 2. 619. 1847. Presumably based on *T. aestivum* L.
Triticum sativum var. *compositum* Wood, Class-book ed. 2. 619. 1847. Presumably based on *T. compositum* L.
Triticum sativum var. *vulgare* Vilm., Blumengartn. 1: 1217. 1896. Based on *T. vulgare* Vill.
Triticum aestivum subsp. *vulgare* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 142. 1912. Based on *T. vulgare* Vill.
Zeia vulgaris var. *aestiva* Lunell, Amer. Midl. Nat. 4: 226. 1915. Based on "*Triticum vulgare aestivum* L." error for *T. aestivum.*

Triticum compactum Host, Gram. Austr. 4: 4. pl. 7. 1809. Cultivated in Austria.

Triticum dicoccoides Koern., Ber. Deut. Bot. Gesell. 26: 309. 1908. Palestine.

Triticum dicoccum Schrank, Baier. Fl. 1: 389. 1789. Cultivated in Europe.
Triticum aestivum subsp. *dicoccum* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 141. 1912. Based on *T. dicoccum* Schrank.
Triticum aestivum var. *dicoccum* Bailey, Gentes Herb. 1: 133. 1923. Based on *T. dicoccum* Schrank.

Triticum durum Desf., Fl. Atlant. 1: 114. 1798. North Africa.
Triticum aestivum subsp. *durum* Thell., Mém. Soc. Sci. Nat. Cherbourg 38: 143. 1912. Based on *T. durum* Desf.

Triticum monococcum L., Sp. Pl. 86. 1753. Cultivated in Europe.
Triticum aestivum var. *monococcum* Bailey, Gentes Herb. 1: 133. 1923. Based on *T. monococcum* L.

Triticum polonicum L., Sp. Pl. ed. 2. 127. 1762. Cultivated in Europe.
Triticum aestivum var. *polonicum* Bailey, Man. Cult. Pl. 116. 1924. Based on *T. polonicum* L.

Triticum spelta L., Sp. Pl. 86. 1753. Cultivated in Europe.
Triticum aestivum subsp. *spelta* Thell., Mitt. Naturw. Ges. Winterthur. 12: 147. 1918. Based on *T. spelta* L.
Triticum aestivum var. *spelta* Bailey, Gentes Herb. 1: 133. 1923. Based on *T. spelta* L.

Triticum turgidum L., Sp. Pl. 86. 1753. Cultivated in Europe.

(20) UNIOLA L.

(2) **Uniola latifolia** Michx., Fl. Bor. Amer. 1: 70. 1803. The locality as published is Allegheny Mountains, but the type specimen is from Illinois.

(6) **Uniola laxa** (L.) B.S.P., Prel. Cat. N.Y. 69. 1888. Based on *Holcus laxus* L.

Holcus laxus L., Sp. Pl. 1048. 1753. Virginia.

Uniola gracilis Michx., Fl. Bor. Amer. 1: 71. 1803. Carolina to Georgia, *Michaux.*

Uniola virgata Bartr.; Pursh, Fl. Amer. Sept. 1: 82. 1814, as synonym of *Uniola gracilis* Michx.

Chasmanthium gracile Link, Hort. Berol. 1: 159. 1827. Based on *Uniola gracilis* Michx.

Uniola uniflora Benke, Rhodora 31: 148. 1929. Memphis, Tenn., *Benke* 4874.

(3) **Uniola nitida** Baldw.; Ell., Bot. S.C. and Ga. 1: 167. 1816. Camden County, Ga., *Baldwin.*

Uniola intermedia Bosc; Beauv., Ess. Agrost. 75, 181. 1812. Name only. [A Bosc specimen so named in Padua is *U. nitida;* another in Paris is *U. sessiliflora.*]

(4) **Uniola ornithorhyncha** Steud., Syn. Pl. Glum. 1: 280. 1854. Alabama, *Drummond* 51.

Chasmanthium ornithorhynchum Nees; Steud., Syn. Pl. Glum. 1: 280. 1854, as synonym of *Uniola ornithorhyncha* Steud.

(1) **Uniola paniculata** L., Sp. Pl. 71. 1753. Carolina.

Briza caroliniana Lam., Encycl. 1: 465. 1785. Carolina.

Uniola maritima Michx., Fl. Bor. Amer. 1: 71. 1803. Carolina, *Michaux.*

Trisiola paniculata Raf., Fl. Ludov. 144. 1817. Based on *Uniola paniculata* L.

Nevroctola maritima Raf.; Jacks., Ind. Kew. 3: 311. 1894, as synonym of *Uniola paniculata* L.

Nevroctola paniculata Raf.; Jacks., Ind. Kew. 3: 311. 1894, as synonym of *Uniola paniculata* L.

Uniola floridana Gandog., Bull. Soc. Bot. France 66[7]: 304. 1920. Santa Rosa Island, Fla., *Tracy* 4545.

Uniola heterochroa Gandog., Bull. Soc. Bot. France 66[7]: 304. 1920. Punta Rassa, Fla., *Hitchcock* 535.

Uniola macrostachys Gandog., Bull. Soc. Bot. France 66[7]: 304. 1920. Breton Island, La., *Tracy* 462.

(5) **Uniola sessiliflora** Poir., in Lam., Encycl. 8: 185. 1808. Carolina, *Bosc.*

Poa sessiliflora Kunth, Rév. Gram. 1: 111. 1829. Based on *Uniola sessiliflora* Poir.

Uniola longifolia Scribn., Bull. Torrey Bot. Club 21: 229. 1894. Georgia [type, DeKalb County, *Small* in 1893], Florida, Mississippi, Tennessee.

(30) VASEYOCHLOA Hitchc.

(1) **Vaseyochloa multinervosa** (Vasey) Hitchc., Jour. Wash. Acad. Sci. 23: 452. 1933. Based on *Melica multinervosa* Vasey.

Melica multinervosa Vasey, Bot. Gaz. 16: 235. 1891. Brazos Santiago, Tex., *Nealley.*

Distichlis multinervosa Piper, Biol. Soc. Wash. Proc. 18: 147. 1905. Based on *Melica multinervosa* Vasey.

Triodia multinervosa Hitchc., Biol. Soc. Wash. Proc. 41: 159. 1928. Based on *Melica multinervosa* Vasey.

Vetiveria zizanioides (L.) Nash, in Small, Fl. Southeast. U.S. 67. 1903. Based on *Phalaris zizanioides* L.

Phalaris zizanioides L., Mant. Pl. 2: 183. 1771. India.

Andropogon muricatus Retz., Obs. Bot. 3: 43 [31]. 1783. India.

Anatherum muricatum Beauv., Ess. Agrost. 150. pl. 22. f. 10. 1812. Based on *Andropogon muricatus* Retz.

Vetiveria muricata Griseb., Fl. Brit. W.Ind. 560. 1864. Based on *Andropogon muricatus* Retz.

Vetiveria arundinacea Griseb., Fl. Brit. W.Ind. 560. 1864. Jamaica and Trinidad.

Sorghum zizanioides Kuntze, Rev. Gen. Pl. 2: 791. 1891. Based on *Phalaris zizanioides* L.

Andropogon zizanioides Urban, Symb. Antill. 4: 79. 1903. Based on *Phalaris zizanioides* L.

Holcus zizanioides Kuntze, Stuck., An. Mus. Nac. Buenos Aires 11: 48. 1904. Based on *Phalaris zizanioides* L.

Anatherum zizanioides Hitchc. and Chase, Contrib. U.S. Natl. Herb. 18: 285. 1917. Based on *Phalaris zizanioides* L.

(96) WILLKOMMIA Hack.

(1) **Willkommia texana** Hitchc., Bot. Gaz. 35: 283. f. 1. 1903. Ennis, Tex. *J. G. Smith* in 1897.

(159) ZEA L.

(1) **Zea mays** L., Sp. Pl. 971. 1753. America.

Zea americana Mill., Gard. Dict. ed. 8. Zea no. 1. 1768. West Indies.

Zea vulgaris Mill., Gard. Dict. ed. 8. Zea no. 3. 1768. Northern parts of America.

Mays zea Gaertn., Fruct. and Sem. 1: 6. pl. 1. f. 9. 1788. Based on *Zea mays* L.

Zea segetalis Salisb., Prodr. Stirp. 28. 1796. Based on *Zea mays* L.

Mays americana Baumg., Enum. Stirp. Transsilv. 3: 281. 1816. Based on *Zea mays* L.

Zea mays var. *precox* Torr., in Eaton, Man. Bot. ed. 2. 500. 1818. Northern and Middle States.

Mayzea cerealis Raf., Med. Fl. 2: 241. 1830. Based on *Zea mays* L.

Zea hirta Bonaf., Hist. Nat. Mais 29. pl. 4. 39. pl. 4. 1836. Cultivated, seed from California.

Zea mays pensylvanica Bonaf., Hist. Nat. Mais 33. pl. 7. f. 4. 1836. Cultivated.

Zea mays virginica Bonaf., Hist. Nat. Mais 37. pl. 10. f. 15. 1836. Cultivated.

Zea erythrolepis Bonaf., Hist. Nat. Mais 30. pl. 5; 38. pl. 11. f. 17. 1836. Cultivated along Missouri River.

Zea mais hirta Alefeld, Landw. Fl. 309. 1866. Based on *Zea hirta* Bonaf.

Zea saccharata Sturtev., N.Y. State Agr. Expt. Sta. Rept. 1884[3]: 156. 1885 Group name for sweet corn.

Zea canina S. Wats., Amer. Acad. Sci. Proc. 26: 160. 1891. Mexico. Hybrid with *Euchlaena mexicana* Schrad., fide G. N. Collins.

Zea mays saccharata Bailey, Cycl. Hort. 4: 2006. 1902. Based on *Z. saccharata* Sturtev.

ZEA MAYS var. EVERTA Bailey, Cycl. Hort. 4: 2005. 1902. Based on *Z. everta* Sturtev.

Zea everta Sturtev., N.Y. State Agr. Expt. Sta. Rept. 1884[3]: 183. 1885. Group name for popcorn.

ZEA MAYS var. JAPONICA (Van Houtte) Wood, Amer. Bot. and Flor. pt. 2: 409. 1870. Presumably based on *Z. japonica* Van Houtte.

Zea japonica Van Houtte, Fl. Serr. Jard. 16: 121. 1865. Japan.

ZEA MAYS var. TUNICATA St. Hil., Ann. Sci. Nat., Bot. 16: 144. 1829. Uruguay.

Zea cryptosperma Bonaf., Hist. Nat. Mais 30, 40. pl. 5 bis. 1836. Based on *Z. mais* var. *tunicata* St. Hil.

Zea tunicata Sturtev., Bull. Torrey Bot. Club 21: 335. 1894. Based on *Z. mays* var. *tunicata* St. Hil.

Of the many names published for forms of *Zea mays* only those based on material from the United States are given above, and of these only such as apply to the better-known races. See Sturtevant, N.Y. State Agr. Expt. Sta. Rept. and Bailey, Cycl. Hort. for additional names.

(113) ZIZANIA L.

(1) **Zizania aquatica** L., Sp. Pl. 991. 1753. Virginia. [Jamaica, also cited, is erroneous.]

Zizania clavulosa Michx., Fl. Bor. Amer. 1: 75. 1803. North America, *Michaux.*

Hydropyrum esculentum Link, Hort. Berol. 1: 252. 1827. North America.

Stipa angulata L.; Steud., Nom. Bot. ed. 2. 2: 642. 1841, as synonym of *Hydropyrum esculentum* Link.

Zizania effusa Munro, Jour. Proc. Linn. Soc. 6: 52. 1862, as synonym of *Z. aquatica* L.

Ceratochaete aquatica Lunell, Amer. Midl. Nat. 4: 214. 1915. Based on *Zizania aquatica* L.

Zizania aquatica var. *interior* Fassett, Rhodora 26: 158. 1924. Armstrong, Iowa, *Pammel* and *Cratty* 764.

Zizania interior Rydb., Brittonia 1: 82. 1931. Based on *Z. aquatica* var. *interior* Fassett.

ZIZANIA AQUATICA var. ANGUSTIFOLIA Hitchc., Rhodora 8: 210. 1906. Belgrade, Maine, *Scribner* in 1895.

Zizania palustris L., Mant. Pl. 295. 1771. North America.

Melinum palustre Link, Handb. Gewächs. 1: 96. 1829. Based on *Zizania palustris* L.

(2) **Zizania texana** Hitchc., Jour. Wash. Acad. Sci. 23: 454. 1933. San Marcos, Tex., *Silveus*.

(114) ZIZANIOPSIS Doell and Aschers.

(1) **Zizaniopsis miliacea** (Michx.) Doell and Aschers.; Doell, in Mart., Fl. Bras. 2^3: 13. 1871. Presumably based on *Zizania miliacea* Michx.

Zizania miliacea Michx., Fl. Bor. Amer. 1: 74. 1803. North America, *Michaux*.

(87) ZOYSIA Willd.

Zoysia japonica Steud., Syn. Pl. Glum. 1: 414. 1854. Japan.

Zoysia pungens var. *japonica* Hack., Bull. Herb. Boiss. 7: 642. 1899. Based on *Z. japonica* Steud.

Osterdamia japonica Hitchc., U.S. Dept. Agr. Bull. 772: 166. 1920. Based on *Zoysia japonica* Steud.

Zoysia matrella (L.) Merr., Philippine Jour. Sci. Bot. 7: 230. 1912. Based on *Agrostis matrella* L.

Agrostis matrella L., Mant. Pl. 2: 185. 1771. Malabar, India.

Zoysia pungens Willd., Gesell. Naturf. Freund. Berlin Neue Schrift. 3: 441. 1801. Malabar, India.

Osterdamia matrella Kuntze, Rev. Gen. Pl. 2: 781. 1891. Based on *Agrostis matrella* L.

Osterdamia zoysia Honda, Bot. Mag. [Tokyo] 36: 113. 1922. Based on *Zoysia pungens* Willd.

Zoysia tenuifolia Willd.; Trin, Mém. Acad. St. Pétersb. VI. Sci. Nat. 2^1: 96. 1836. Mascarene Islands.

Osterdamia tenuifolia Kuntze, Rev. Gen. Pl. 2: 781. 1891. Based on *Zoysia tenuifolia* Willd.

Zoysia pungens var. *tenuifolia* Dur. and Schinz, Consp. Fl. Afr. 5: 734. 1894. Based on *Z. tenuifolia* Willd.

Osterdamia zoysia var. *tenuifolia* Honda, Bot. Mag. [Tokyo] 36: 113. 1922. Based on *Zoysia tenuifolia* Willd.

UNIDENTIFIED NAMES

The following names of grasses, based on specimens collected in the United States, cannot be identified from the descriptions, and the types have not been located. Several of these names are not effectively published.

Agrostis affinis Schult., Mant. 2: 195. 1824. Based on *Agrostis* no. 17 in Muhlenberg's Descriptio Graminum p. 75. *Sporobolus muhlenbergii* Kunth, Rév. Gram. 1: 68. 1829, and *Vilfa muhlenbergii* Steud., Syn. Pl. Glum. 1: 162. 1854, are also based on this. (See Hitchcock, Bartonia 14: 33. 1932.)

Agrostis altissima var. *laxa* Tuckerm., Amer. Jour. Sci. 45: 44. 1843. White Mountains, N.H., *Trichodium altissimum* var. *laxum* Wood, Class-book ed. 2. 600. 1847, presumably based on this.

Agrostis michauxii Zuccagni, in Roemer, Coll. Bot. 123. 1809. Seed received from Thouin, collected in Kentucky by Michaux. Not *A. michauxii* Trin., 1824?

Agrostis pauciflora Pursh, Fl. Amer. Sept. 1: 63. 1814. Not *A. pauciflora* Schrad., 1806. "On high mountains in Virginia and Carolina." In the Kew Herbarium is a specimen of *Muhlenbergia schreberi* marked "N. Amer. Mr. Fred. Pursh, Herb. propr." but with no name on the label. The description does not agree with this specimen, though it suggests some species of *Muhlenbergia*. *A. oligantha* Roem. and Schult., Syst. Veg. 2: 372. 1817, *Polypogon pauciflorus* Spreng., Syst. Veg. 1: 243. 1825, and *Muhlenbergia tenuiflora pauciflora* Scribn., Mem. Torrey Bot. Club 5: 37. 1894, are based on this.

Agrostis viridis Raf., Amer. Monthly Mag. 356. 1811. Not *A. viridis* Gouan, 1762. [United States.]

Aira capillacea Lam., Tabl. Encycl. 1: 177. 1791. Carolina, *Fraser.*

Aira compressa Raf., Amer. Monthly Mag. 356. 1811. [United States.] Name only.

Aira serotina Torr.; Trin., in Steud., Nom. Bot. ed. 2. 1: 45. 1840. North America. Name only.

Andropogon sessiliflorus Raf., Bull. Bot. Seringe 1: 221. 1830. [United States.] Name only, under section *Dimeiostemon.* In Index Kewensis (1: 760. 1893) the name is listed as *Dimeiostemon sessiliflorus* Raf.

Anthipsimus gonopodus Raf., Jour. Phys. Chym. 89: 105. 1819. Dry hills of the Ohio.

Apluda scirpoides Walt., Fl. Carol. 250. 1788. South Carolina. Not a grass, apparently a sedge.

Arundo confinis Willd., Enum. Pl. 127. 1809. North America. *Calamagrostis confinis* Beauv., Ess. Agrost. 15, 152. 1812, *Deyeuxia confinis* Kunth, Rév. Gram. 1: 76. 1829, and *C. neglecta* var. *confinis* Beal, Grasses N. Amer. 2: 353. 1896, are based on this.

Arundo glauca Hornem., Hort. Hafn. 1: 74. 1813. Not *A. glauca* Bieb., 1808. North America.

Arundo pallens Muhl.; Steud., Nom. Bot. ed. 2. 1: 144. 1840. Pennsylvania. Name only, in Schrader Herbarium.

Briza virens Walt., Fl. Carol. 79. 1788. Not *B. virens* L., 1762. See Hitchcock, Rep. Missouri Bot. Gard. 16: 49. 1905. *Poa virens* Jacq., Eclog. Gram. 54. pl. 36. 1820, is based on this. The figure represents a species of *Poa.*

Calamagrostis pumila Nutt.; Gray, Acad. Nat. Sci. Phila. Proc. 1862: 334. 1863. Not *C. pumila* Hook., 1851. Name only for a plant collected in the Rocky Mountains by Nuttall.

Calotheca macrostachya Presl, Rel. Haenk. 1: 268, 351. 1830. In Addenda et Corrigenda (p. 351) the original "in montanis Peruviae. . . " is changed to "ad Monte-Rey Californiae." This locality, as in the case of several other species described by Presl, is erroneous. (See Hitchcock, Contrib. U.S. Natl. Herb. 24: 335. 1927.)

Cenchrus carolinianus Walt., Fl. Carol. 79. 1788. South Carolina. (See Chase, Contrib. U.S. Natl. Herb. 22: 76. 1920.)

Cenchrus gracilis Beauv., Ess. Agrost. 57, 157. 1812. Name only for a specimen sent by Bosc, presumably from the Carolinas.

Chloris longibarba Michx.; Beauv., Ess. Agrost. 79, 158. 1812. Name only.

Deyeuxia airoides Beauv., Ess. Agrost. 44, 152, 160. 1812. "*Arundo airoides* Mich. ined." is referred to *Deyeuxia. Arundo airoides* Lam. was described from a plant collected in North America by Michaux and is probably the species Beauvois had in mind. Lamarck's description suggests *Trisetum melicoides* (Michx.) Scribner, which was collected by Michaux and described by him as *Aira melicoides.*

Deyeuxia halleriana Vasey, Descr. Cat. Grasses U.S. 50. 1885. Name only for a specimen from Washington Territory.

Eragrostis alba Presl, Rel. Haenk. 1: 279. 1830. "Monte-Rey, California", *Haenke.* Locality erroneous, the plant probably collected in Peru.

Eragrostis lugens var. *major* Vasey; L. H. Dewey, Contrib. U.S. Natl. Herb. 2: 542. 1894. "Texas to Arizona and eastward to Florida."

Festuca glabra Spreng., Syst. Veg. 1: 353. 1825. Not *F. glabra* Lightf., 1777. Long Island, N.Y. The description suggests *Puccinellia distans* (L.) Parl.

Festuca grandiflora Lam., Tabl. Encycl. 1: 191. 1791. Carolina, *Fraser.*

Flexularia compressa Raf., Jour. Phys. Chym. 89: 105. 1819. Kentucky and Ohio.

Koeleria airoides Nutt.; Steud., Nom. Bot. 456. 1821. Name only. Referred doubtfully in Index Kewensis to *Arundo airoides* Lam.

Leptopyrum tenellum Raf., Med. Repos. N.Y. 5: 351. 1808. [United States.] Name only.

Lolium canadense Michx.; Brouss., Elench. Pl. Hort. Monsp. 35. 1805, name only; Roem. and Schult., Syst. Veg. 2: 893. 1817. Grown in Montpellier. The description rather suggests a tall plant of *L. perenne* L. *Lolium temulentum* var. *canadense* Wood, Amer. Bot. and Flor. pt. 2: 406. 1870, based on this.

Melica altissima Walt., Fl. Carol. 78. 1788. Not *M. altissima* L., 1753. (See Hitchcock, Mo. Bot. Gard. Rept. 16: 47. 1905.)

Muhlenbergia anemagrostoides Trin.; Steud., Nom. Bot. ed. 2. 2: 164. 1841. America. Name only.

Paneion buckleyanum var. *maius* Lunell, Amer. Midl. Nat. 4: 222. 1915. Change of name for "*Poa tenuifolia* var. *maior* (Vasey)", but that name was never published, and no specimen so named by Vasey can be found.

Panicum americanum L., Sp. Pl. 56. 1753. America. This name and *Pennisetum americanum* Schum., based on it, have been used for *P. glaucum* (L.) R. Br. The original description is unidentifiable, probably based on a confusion of two or more species. (See Chase, Contrib. U.S. Natl. Herb. 22: 218. 1921; Amer. Jour. Bot. 8: 43. 1921.)

Panicum anomalum Walt., Fl. Carol. 72. 1788. South Carolina. A species of *Setaria*. (See Hitchcock, Mo. Bot. Gard. Rept. 16: 35. 1905.)

Panicum barbatum LeConte; Torr., in Eaton, Man. Bot. ed. 2. 342. 1818. Not *P. barbatum* Lam., 1791. New York. The description rather suggests *P. barbulatum* Michx.

Panicum cartilagineum Muhl., Descr. Gram. 128. 1817. Georgia. (See Hitchcock, Bartonia 14: 41. 1932.)

Panicum debile Torr.; Steud., Nom. Bot. ed. 2. 255. 1841. Not *P. debile* Desf., 1798. As synonym of *P. pubescens*.

Panicum densum Muhl., Descr. Gram. 122. 1817. No locality given. The description suggests one of the Lanuginosa group.

Panicum dichotomum var. *curvatum* Torr., Fl. North. and Mid. U.S. 145. 1824. No locality given.

Panicum dichotomum var. *gracile* Torr., Fl. North. and Mid. U.S. 145. 1824. "Common in swamps, New York."

Panicum dichotomum var. *pubescens* Munro, in Benth., Pl. Hartw. 341. 1857. Sacramento, Calif., *Hartweg*. Name only.

Panicum dichotomum var. *spathaceum* Wood, Bot. and Flor. pt. 2: 393. 1870. No locality mentioned.

Panicum discolor Spreng., Mant. Fl. Hal. 31. 1807. Pennsylvania. A species of the subgenus *Dichanthelium*.

Panicum elliottii Spreng.; Steud., Nom. Bot. ed. 2. 2: 256. 1841. Not *P. elliottii* Trin., 1829. As synonym of *P. pubescens*.

Panicum fimbriatum Willd.; Spreng., Syst. Veg. 1: 316. 1825, as synonym of *P. viscidum* Ell. [*P. scoparium* Lam.] South Carolina. A specimen in the Willdenow Herbarium so named is *P. albomaculatum* Scribn., from Mexico, collected by Humboldt.

Panicum flexuosum Raf., Jour. Bot. Desv. 4: 273. 1814. Not *P. flexuosum* Retz., 1791. New Jersey. *P. rafinesquianum* Schult., Mant. 2: 257. 1824, is based on this.

Panicum gracilescens Desv.; Poir., in Lam., Encycl. Sup. 4: 279. 1816. Carolina. Desvaux gives a later description (Opusc. 95. 1831), which disagrees in some respects with that of Poiret.

Panicum iowense Ashe, N.C. Agr. Expt. Sta. Bull. 175: 115. 1900. Iowa to Kansas. The description suggests *P. huachucae* or *P. praecocius*. (See Contrib. U.S. Natl. Herb. 15: 330. 1910.)

Panicum muhlenbergianum Schult., Mant. 2: 230. 1824. Based on *Panicum* no. 27 of Muhlenberg's Descriptio Graminum, the description of which is copied. Muhlenberg gives "Habitat in Georgia."

Panicum nitidum var. *glabrum* Torr., Fl. North. and Mid. U.S. 146. 1824. No locality cited. The description suggests *P. commutatum* Schult.

Panicum nitidum var. *gracile* Torr., Fl. North. and Mid. U.S. 146. 1824. Near New York. The description applies fairly well to the vernal phase of *P. dichotomum* L.

Panicum nitidum var. *majus* Vasey, Contrib. U.S. Natl. Herb. 3: 30. 1892. No locality cited. Vasey says, "Here could be placed several variable forms."

Panicum pensylvanicum Spreng., Nachtr. Bot. Gart. Halle 30. 1801. Pennsylvania.

Panicum pumilum Raf., Med. Repos. N.Y. 5: 353. 1808. Name only.

Panicum speciosum Walt., Fl. Carol. 73. 1788. South Carolina. The description faintly suggests *Sporobolus gracilis* (Trin.) Merr.

Panicum uniflorum Raf., Amer. Monthly Mag. 2: 120. 1817. Flatbush, N.Y. Some species of subgenus *Dichanthelium*.

Panicum vilfiforme Wood, Class-book ed. 3. 785. 1861. East Tennessee. Appears to be a species of the group Agrostoidia.

Paspalum compressum Raf., Fl. Ludov. 15. 1817. Louisiana prairies, Robin.

Paspalum dasyphyllum var. *floridanum* Wood, Amer. Bot. and Flor. pt. 2: 390. 1870. [Florida.]

Paspalum geniculatum Raf., Fl. Ludov. 15. 1817. Louisiana, Robin.

Paspalum supinum Rich.; Hornem., Hort. Hafn. 1: 77. 1813. Not *P. supinum* Bosc, 1804. Baltimore, introduced in the Royal Botanic Garden in Copenhagen in 1807. Probably *P. pubescens* Muhl.

Paspalum virgatum var. *latifolium* Wood, Amer. Bot. and Flor. pt. 2: 309. 1870. Eastern States. Wood's *P. virgatum* appears to be *Paspalum boscianum* Flügge; the variety may be a luxuriant form of this species.

Penniselum glaucum var. *purpurascens* Eaton and Wright, N.Amer. Bot. ed. 8. 346. 1840. Virginia and northward.

Poa alata Desv., Opusc. 102. 1831. "Carolina?"

Poa nemoralis [L., misapplied by] Pursh, Fl. Amer. Sept. 1: 79. 1814. North America.

Poa tenuifolia Raf., Med. Repos. N.Y. 5: 353. 1808. [United States.] Name only.

Saccharifera spontanea Stokes, Bot. Mat. Med. 1: 132. 1812. South Carolina. Probably a species of *Erianthus*.

Scsleria americana Nees; Steud., Syn. Pl. Glum. 1: 296. 1854. Staten Island, N.Y.

Setaria caudata var. *pauciflora* Jones, Contrib. West. Bot. 16: 13. 1930. No description, "(Vassey) as *Chaetochloa*" cited. There is nothing of Vasey's that can be associated with this (*Chaetochloa* was published 5 years after Vasey's death). Arizona, *Jones* 24697, 24698 cited. Mr. Jones states in a letter of September 28, 1932, that he could not recollect the basis for the name, and that he could not find the specimens cited.

Stipa spicata Walt., Fl. Carol. 78. 1788. Not *S. spicata* L. f., 1781. South Carolina. Apparently a species of *Andropogon*.

Triodia repens Vasey, Bull. Torrey Bot. Club 15: 49. 1888. Name only for a specimen collected by "Nealley, Western Texas."

Triticum aegilopoides Thurb.; A. Gray, Acad. Nat. Sci. Phila. Proc. 1863: 79. 1863. Name only. Rocky Mts., *Hall* and *Harbour* 656.

Vilfa varians Buckl., Acad. Nat. Sci. Phila. Proc. 1862: 89. 1863. Rocky Mountains, *Nuttall*. Apparently a species of *Sporobolus*.

PERSONS FOR WHOM GRASSES HAVE BEEN NAMED

This list includes names of persons for whom valid genera, species, or varieties of grasses in the Manual have been named.

Addison. See Brown.

Anderson, C. L. (–1910). Botanist of Santa Cruz, Calif. *Stipa lepida* var. *andersoni*.

Arsène, Bro. Gerfroy (1867–). Professor in the Sacred Heart Training College, Las Vegas, N.Mex.; collected extensively in Mexico. *Muhlenbergia arsenei*.

Ashe, W. W. (1872–1932). Botanist and forester, United States Forest Service. *Panicum ashei*.

Baker, C. F. (1872–1927). Botanist and entomologist, collected in the United States, Cuba, and Philippine Islands. *Agropyron bakeri; Agrostis bakeri*.

Baker, C. H. (1848–). Botanist of Florida. *Spartina bakeri*.

Barrelieri, Jacques (1606–73). French botanist. *Eragrostis barrelieri*.

Beckmann, Johann (1739–1811). German botanist. *Beckmannia*.

Bélanger, Charles. French botanist, who collected extensively in the Old World. Steudel used *belangeri* as specific name for *Anthephora belangeri* (*Hilaria belangeri*), apparently through inadvertence, to commemorate *Berlandier*, collector of the type specimen.

Berg, F. G. C. (1843–1902). Director, Museo Nacional de Buenos Aires. *Panicum bergii*.

Bertero, C. G. (1789–1831). Italian botanist. *Tragus berteronianus*.

Beyrich, H. K. (1796–1834). Prussian botanist, who collected from Georgia to Texas. *Eragrostis beyrichii*.

Bicknell, E. P. (1859–1925). Botanist of New York City. *Panicum bicknellii*.

Bigelow, J. M. (1804–78). Botanist, who collected in the Southwestern States. *Blepharidachne bigelovii; Poa bigelovii*.

Blasdale, W. C. (1871–). Chemist of California, who collected grasses in that State. *Agrostis blasdalei*.

Blodgett, J. L. (1809–53). Physician of Key West, who collected in southern Florida. *Paspalum blodgettii*.

Bloomer, H. G. (1821–74). Botanist of California. *Oryzopsis bloomeri*.

Bolander, H. N. (1831–97). Botanist of California. *Calamagrostis bolanderi; Poa bolanderi; Scribneria bolanderi*.

Bosc, L. A. G. (1759–1828). French botanist, who collected in North Carolina and South Carolina from 1798 to 1800. *Panicum boscii; Paspalum boscianum.*

Boutelou, Claudio (1774–1842). The brothers, Claudio and Estéban, Spanish gardeners, are commemorated by the genus *Bouteloua.*

Brewer, W. H. (1828–1910). Botanist of California. *Calamagrostis breweri.*

Brown, Addison (1830–1913). Botanist of New York; joint author of Britton and Brown's Illustrated Flora. *Panicum addisonii.*

Buckley, S. B. (1809–84). Collected plants from Georgia to Texas; described grasses from Texas and Oregon. *Sporobolus buckleyi; Triodia buckleyana.*

Cabanis, Jean (1816–1906). German ornithologist, who collected plants in Florida. *Andropogon cabanisii.*

Cain, S. A. (1902–). Botanist of Indiana. *Calamagrostis cainii.*

Canby, W. M. (1831–1904). Botanist of Delaware. *Poa canbyi.*

Chapman, A. W. (1809–99). Botanist of Apalachiccla, Fla.; author of Flora of the Southern United States. *Gymnopogon chapmanianus; Panicum chapmani; Poa chapmaniana.*

Clute, W. N. (1869–). Professor of botany, Butler University, Indianapolis, Ind. *Panicum clutei.*

Combs, Robert (1872–99). Botanist, who collected in Florida and Cuba. *Panicum combsii.*

Commons, Albert (1829–1919). Botanist of Delaware. *Panicum commonsianum.*

Cotta, Heinrich (1763–1844). German botanist. *Cottea.*

Curtiss, A. H. (1845–1907). Botanist of Jacksonville, Fla. *Aristida curtissii; Calamovilfa curtissii; Sporobolus curtissii.*

Cusick, W. C. (1842–1922). Botanist of Oregon. *Poa cusickii.*

Danthoine, Étienne. French botanist. *Danthonia.*

Deam, C. C. (1865–). Botanist of Indiana. *Panicum deamii.*

Deschamps of St. Omer. Naturalist, who accompanied de la Billardiere on the expedition in search of la Pérouse in 1791.[33] *Deschampsia.*

Desmazières, J. H. (1796–1862). French botanist, who wrote a work on the grasses of northern France. *Desmazeria sicula.*

Deyeux, Nicolas (1753–1837). French botanist. *Deyeuxia.*

Douglas, David (1798–1834). British botanist, who collected in California and northwest North America. *Poa douglasii.*

Drummond, Thomas (1780–1835). Scotch nurseryman and botanist, curator of the Belfast Botanic Garden, who traveled with the Second Franklin Expedition, and collected in northwestern America and in Texas. *Sorghum vulgare* var. *drummondii; Triodia drummondii.*

Dumont-d'Urville, Jules S. C. (1790–1842). French explorer, who commanded the expedition of the *Astrolabe* and *Zélée* around the world. *Panicum urvilleanum; Paspalum urvillei.*

Eastwood, Alice (1859–). Botanist of California. *Festuca eastwoodae.*

Elliott, Stephen (1771–1830). Botanist of Charleston, S.C., author of A Sketch of the Botany of South Carolina and Georgia. *Agrostis elliottiana; Andropogon elliottii; Eragrostis elliottii; Sorghastrum elliottii.*

Elmer, A. D. E. (1870–). Botanist, who collected in the State of Washington and later in the Philippine Islands. *Agropyron elmeri; Festuca elmeri; Stipa elmeri.*

Emersley, J. D. Botanist, who collected in the Southwestern States. *Muhlenbergia emersleyi.*

Fendler, August (1813–1883). Botanist, who collected in New Mexico, also in Panama and Venezuela. *Aristida fendleriana; Poa fendleriana.*

Frank, Joseph (–1835). Botanist, who collected in Ohio. *Eragrostis frankii.*

Gattinger, Augustin (1825–1903). Botanist of Tennessee. *Panicum gattingeri.*

Gay, Jacques (1786–1864). French botanist, who traveled in Africa. *Chloris gayana.*

Geyer, C. A. (1809–53). Botanist, who collected in Illinois and Oregon. *Melica geyeri.*

Ghiesbreght, August (1810–93). Botanist, who collected in Mexico. *Panicum ghiesbreghtii.*

Gouin. French physician, who lived at Vera Cruz, Mexico. *Panicum gouini.*

Gray, Asa (1818–88). Professor of botany, Harvard University. *Festuca grayi.*

[33] Lasègue, Mus. Bot. Deless. 75. 1845.

Greene, E. L. (1843–1915). Professor of botany at the University of California, and later at Catholic University of America. *Orcuttia greenei.*

Griffiths, David (1867–). Botanist, United States Department of Agriculture. *Agropyron griffithsi.*

Grisebach, A. H. R. (1814–79). German botanist, author of Flora of the British West Indian Islands and other works. *Setaria grisebachii.*

Gussone, Giovanni (1782–1866). Italian botanist. *Bromus rigidus* var. *gussonii; Hordeum gussoneanum.*

Hackel, Eduard (1850–1926). Eminent Austrian agrostologist. *Hackelochloa.*

Hall, Elihu (1822–82). Botanist, who collected in Texas, Oregon, and the Rocky Mountains. *Agrostis hallii; Andropogon hallii; Panicum hallii.*

Hall, H. M. (1874–1932). Professor of botany, University of California. *Bromus orcuttianus* var. *hallii.*

Hansen, George (1863–1908). Botanist, who collected in California. *Sitanion hanseni.*

Harford, W. G. W. (1831–1911). Conchologist, colleague of Bolander. Collected in California and Oregon. *Melica harfordii.*

Hartweg, Theodor (1812–71). German botanist, sent by the Horticultural Society of London to Mexico to collect plants. *Paspalum hartwegianum.*

Havard, Valery (1846–1927). Army surgeon, who collected in Texas. *Panicum havardii.*

Heller, A. A. (1867–). Botanist, who collected in the Western States, Puerto Rico, and Hawaii. *Panicum helleri.*

Henderson, L. F. (1853–). Curator, Oregon University Herbarium, Eugene. Collected plants in Oregon, Washington, and Idaho. *Agrostis hendersonii; Oryzopsis hendersoni.*

Hilaire, Auguste St. (1779–1853). French botanist (Saint-Hilaire). *Hilaria.*

Hillman, F. H. (1863–). Botanist, United States Department of Agriculture. *Panicum hillmani.*

Hitchcock, A. S. (1865–). Agrostologist, United States Department of Agriculture. *Trichachne hitchcockii.*

Hooker, W. J. (1785–1865). Director, Royal Botanic Gardens, Kew, England. *Avena hookeri; Imperata hookeri; Sporobolus asper* var. *hookeri.*

Howell, Thomas (1842–1912). Botanist, who collected in Oregon; author of Flora of Northwest America. *Agrostis howellii; Alopecurus howellii; Calamagrostis howellii; Festuca howellii; Poa howellii.*

Imperato, Ferrante (1550–1625). Italian botanist. *Imperata.*

James, Edwin (1797–1861). Botanist of Major Long's Expedition to the Rocky Mountains (1819–20). *Hilaria jamesii.*

Jepson, W. L. (1867–). Professor of botany, University of California. *Elymus glaucus* var. *jepsoni.*

Jones, M. E. (1852–1934). Curator of herbarium, Pomona College, Claremont, Calif.; collected in the Western States. *Muhlenbergia jonesii.*

Joor, J. F. (1848–92). Professor of botany, Tulane University, New Orleans, La. *Panicum joori.*

Kalm, Peter (1715–79). Swedish botanist, who traveled in Canada and the northeastern United States. *Bromus kalmii.*

Kellogg, Albert (1813–87). Botanist of California. *Poa kelloggii.*

King, Clarence (1842–1901). Geologist in charge of exploration of the fortieth parallel. *Blepharidachne kingii; Festuca kingii; Oryzopsis kingii.*

Koeler, G. L. (1765–1807). German botanist. *Koeleria.*

Lamarck, J. B. (1744–1829). Eminent French botanist. *Lamarckia.*

Lange, J. M. C. (1818–98). Danish botanist. *Paspalum langei.*

Langlois, A. B. (1832–1900). Botanist of Louisiana. *Triodia langloisii.*

Leers, J. D. (1727–74). German botanist. *Leersia.*

Leiberg, J. B. (1853–1913). Botanist, who collected in the Northwestern States. *Panicum leibergii; Poa leibergii.*

Lemmon, J. G. (1832–1908). Botanist of California. *Eriochloa lemmoni; Phalaris lemmoni; Puccinellia lemmoni; Stipa lemmoni.*

Leprieur, F. R. (–1869). French botanist, who traveled in Senegal. *Chloris prieurii.*

Letterman, G. W. (1841–1913). Botanist of Missouri, who collected in the Rocky Mountains. *Poa lettermani; Stipa lettermani.*

Liebmann, F. M. (1813–56). Danish botanist, who collected in Mexico. *Setaria liebmanni.*

Lindheimer, Ferdinand (1801–79). Botanist of New Braunfels, who collected in Texas. *Muhlenbergia lindheimeri; Panicum lindheimeri.*

Macoun, James (1862–1920). Canadian botanist, son of John Macoun.

Calamagrostis canadensis var. *macouniana.*

Macoun, John (1831–1920). Canadian botanist. *Elymus macounii.*

Metcalfe, O. B. (1878–). Botanist, who collected in New Mexico. *Muhlenbergia metcalfei.*

Michaux, André (1746–1802). French botanist, who collected in eastern United States. Author of Flora Boreali-Americana. *Eriochloa michauxii.*

Mohr, Charles (1824–1901). Botanist of Mobile, Ala. *Andropogon mohrii; Aristida mohrii.*

Molina, J. I. (1740–1829). Chilean missionary and botanist. *Molinia.*

Montufar, Carlos. Owner of an hacienda in Ecuador, visited by Humboldt. *Trachypogon montufari.*

Morton, J. S. (1832–1902). Secretary of Agriculture (1893–97). *Avena mortoniana.*

Muhlenberg, G. H. E. (1753–1815). Botanist of Pennsylvania, author of Descriptio Uberior Graminum. *Muhlenbergia; Amphicarpum muhlenbergianum.*

Munro William (1818–80). British botanist, who wrote on grasses. *Munroa.*

Nealley, G. C. Botanist, who collected in Texas. *Leptochloa nealleyi; Sporobolus nealleyi.*

Nees, C. G. D. von Esenbeck. (1776–1858). Eminent German botanist. *Stipa neesiana.*

Nelson, Aven (1859–1934). Professor of botany, University of Wyoming, Laramie. *Stipa columbiana* var. *nelsoni.*

Nelson, E. W. (1855–1934). Zoologist, United States Department of Agriculture, who collected plants in Mexico. *Eriocholoa nelsoni.*

Nuttall, Thomas (1786–1859). Eminent botanist of Philadelphia (born in England) who collected widely in the United States and published The Genera of North American Plants. *Puccinellia nuttalliana.*

Orcutt, C. R. (1864–1929). Botanist of San Diego, Calif. *Orcuttia; Aristida orcuttiana; Bromus orcuttianus; Eragrostis orcuttiana.*

Otis, Ira C. (1861–). Botanist of the State of Washington. *Glyceria otisii.*

Palmer, Edward (1831–1911). Botanical explorer, who collected in the Southwestern States and in Mexico. *Agropyron smithii* var. *palmeri*; *Eragrostis palmeri.*

Parish, S. B. (1838–1928). Botanist of San Bernardino, Calif. *Agropyron parishii; Aristida parishii; Puccinellia parishii.*

Parry, C. C. (1823–90). Botanist, who collected in the Western States and in Mexico. *Bouteloua parryi; Danthonia parryi.*

Patterson, H. N. (1853–1919). Botanist of Illinois, who collected in Colorado. *Poa pattersoni.*

Phipps, C. J. (1744–92). British explorer, who led an expedition to the polar regions. *Phippsia.*

Pickering, Charles (1805–78). Botanist, who accompanied the Wilkes Exploring Expedition. *Calamagrostis pickeringii.*

Poiret, L. M. (1755–1834). French botanist. *Sporobolus poiretii; Setaria poiretiana.*

Porter, T. C. (1822–1901). Professor of botany, Lafayette College, Pennsylvania; collected in Colorado. *Calamagrostis porteri; Melica porteri; Muhlenbergia porteri: Stipa porteri.*

Prieur. See Leprieur.

Pringle, C. G. (1838–1911). Botanical explorer, who collected in the Southwestern States and in Mexico. *Agropyron pringlei; Agrostis hallii* var. *pringlei; Poa pringlei; Stipa pringlei.*

Puccinelli, Benedetto (1808–50). Italian botanist, professor in Lyceum at Lucca. *Puccinellia.*

Pumpelly, Raphael (1837–1923). Geologist, United States Geological Survey. *Bromus pumpellianus.*

Pursh, Frederick (1774–1820). German botanist, who collected in the eastern part of the United States, author of Flora Americae Septentrionalis. *Amphicarpum purshii.*

Ravenel, H. W. (1814–87). Botanist of South Carolina. *Panicum ravenelii.*

Redfield, J. H. (1815–95). Botanist of Philadelphia. *Redfieldia.*

Reimarus, J. A. H. (1729–1814). German botanist. *Reimarochloa.*

Reverchon, Julien (1834–1905). Botanist of Dallas, Tex. *Muhlenbergia reverchoni; Panicum reverchoni.*

Reynaud, J. J. (1773–1842). Surgeon on the *Chevrette*, a French exploring vessel, who collected plants in the Orient. *Neyraudia*, an anagram of *Reynaudia*, a genus of West Indian grasses; *Neyraudia reynaudiana.*

Richardson, Sir John (1787–1865). British botanist, who traveled in Canada. *Stipa richardsoni.*

Roemer, K. F. (1818–91). German botanist, who collected in Texas, 1844–47. *Aristida roemeriana.*

Ross, Edith. Collected in Yellowstone Park. *Agrostis rossae.*

Rothrock, J. T. (1839–1922). Professor of botany, University of Pennsylvania. *Bouteloua rothrockii.*

Rottboell, C. F. (1727–97). Danish botanist. *Rottboellia.*

Roxburgh, William (1759–1815). Scotch botanist, director of the botanical garden at Calcutta. *Sorghum vulgare* var. *roxburghii.*

Rüppel, Edward (1794–1884). German botanist. *Pennisetum ruppelii.*

Runyon, Robert (1881–). Photographer and amateur botanist, Brownsville, Tex. *Digitaria runyoni.*

Saunders, William (1836–1914). Horticulturist, United States Department of Agriculture. *Agropyron saundersii.*

Scheele, Adolf (1808–64). German botanist, who described plants from Texas. *Setaria scheelei.*

Schreber, J. C. D. (1739–1810). German botanist, who wrote on grasses. *Muhlenbergia schreberi.*

Scribner, F. Lamson (1851–). Agrostologist, United States Department of Agriculture. *Scribneria; Agropyron scribneri; Calamagrostis scribneri; Panicum scribnerianum; Stipa scribneri.*

Sello (Sellow), Friedrich (1789–1831). German botanist, who traveled in Brazil. *Cortaderia selloana.*

Short, C. W. (1794–1863.) Botanist of Kentucky. *Festuca shortii.*

Silveus, W. A. (1875–). Botanist of San Antonio, Tex. *Eragrostis silveana.*

Simpson, J. H. (1841–1918). Botanist who collected in Florida. *Digitaria simpsoni; Eriochloa michauxii* var. *simpsoni.*

Smith, C. E. (1820–1900). Botanist, who collected in Michigan. *Melica smithii.*

Smith, J. G. (1866–). Botanist, United States Department of Agriculture, later of Hawaii. *Agropyron smithii.*

Stillman, J. D. B. (1819–88). Pioneer botanist of California. *Stipa stillmanii.*

Suksdorf, W. M. (1850–1932). Botanist of Bingen, Wash. *Bromus suksdorfii.*

Swallen, J. R. (1903–). Agrostologist, United States Department of Agriculture. *Eragrostis swalleni.*

Tharp, B. C. (1885–). Professor of botany, University of Texas. *Sporobolus tharpii.*

Thurber, George (1821–90). Botanist of New York, who collected along the Mexican boundary and wrote on the grasses of California. *Agrostis thurberiana; Festuca thurberi; Muhlenbergia thurberi; Stipa thurberiana.*

Thurow, F. W. (1852–). Botanist of Waller County, Tex. *Panicum thurowii.*

Torrey, John (1796–1873). Physician of New York City and eminent botanist. *Melica torreyana; Muhlenbergia torreyana; Muhlenbergia torreyi.*

Tracy, J. P. (1879–). Botanist of Eureka, Calif. *Festuca tracyi.*

Tracy, S. M. (1847–1920). Botanist of Biloxi, Miss., who collected in the Southern and Western States. *Andropogon tracyi; Eragrostis tracyi; Poa tracyi.*

Trinius, K. B. von (1778–1844). Agrostologist of St. Petersburg, Russia, who described many American grasses. *Bromus trinii.*

Tuckerman, Edward (1817–86). Botanist of New England. *Panicum tuckermani.*

Tweedy, Frank (1854–). Topographic engineer, United States Geological Survey, collected in the Western States. *Bromus pumpellianus* var. *tweedyi; Calamagrostis tweedyi.*

Urville. See Dumont-d'Urville.

Vasey, George (1822–93). Botanist, United States Department of Agriculture, eminent agrostologist. *Vaseyochloa; Poa vaseyochloa.*

Walter, Thomas (1740–88). Botanist of Charleston, S.C., author of Flora Caroliniana. *Echinochloa walteri.*

Webber, Dr. (1740–88). Physician of Sierra Valley, Calif. *Oryzopsis webberi.*

Webber, H. J. (1865–). Botanist, United States Department of Agriculture, now of California, who collected in Nebraska and Florida. *Panicum webberianum.*

Werner, W. C. (1852–). Botanist of Painesville, Ohio. *Panicum werneri.*

Wilcox, T. E. (1840–1932). Army surgeon, who collected in the Western States. *Panicum wilcoxianum.*

Williams, T. A. (1865–1900). Agrostologist, United States Department of Agriculture. *Stipa williamsii.*

Willkomm, H. M. (1821–95). German botanist. *Willkommia.*

Wolf, John (1821–97). Botanist of Canton, Ill., who collected in Illinois and Colorado. *Poa wolfii; Trisetum wolfii.*

Wright, Charles (1811–85). Botanist, who collected in Texas and New Mexico, and in Cuba. *Andropogon wrightii; Aristida wrightii; Muhlenbergia wrightii; Panicum wrightianum; Pappophorum wrightii; Sporobolus wrightii.*

Zois, Karl von (1756–1800). German botanist. *Zoysia.*

GLOSSARY

Abortive. Imperfectly developed.

Acuminate. Gradually tapering to a sharp point. Compare acute.

Acute. Sharp-pointed, but less tapering than acuminate.

Aggregate. Collected together in tufts, groups, or bunches. Applied especially to inflorescences. The racemes are aggregate in several species of *Andropogon.*

Annual. Within 1 year. Applied to grasses which do not live more than 1 year.

Winter annual. A plant which germinates in the fall, lives over winter, and produces its seed the following spring, after which it dies.

Anthesis. The period during which a flower is open. In grasses, when the lemma and palea are expanded and the anthers and stigmas are mature.

Antrorse. Directed upwards or forwards. Applied especially to scabrous or pubescent stems, sheaths, awns, and so on. Opposed to retrorse.

Apiculate. Having a minute pointed tip. Applied especially to fertile lemmas in fruit, such as certain species of *Eriochloa.*

Appressed. Lying against an organ. The branches of an inflorescence may be appressed to the main axis or the hairs on a stem may be appressed to the surface.

Aristate. Awned; provided with a bristle at the end, rarely to the back or edge, of an organ. In grasses applies especially to the awns at the end of the bracts of the spikelet. Compare awn. *Aristulate.* Bearing a short awn.

Articulate. Jointed. Joined by a line of demarcation between two parts which at maturity separate by a clean-cut scar. Certain spikelets are articulate with the pedicel; certain awns with the lemma. *Articulation.* The point of union of two articulate organs.

Ascending. Sloping upward. Applied to stems which curve upward from the base, to the branches of an inflorescence which slope upward at angle of about 40° to 70°, and to other parts such as blades and hairs. Compare appressed and spreading.

Attenuate. Gradually narrowed to a slender apex or base.

Auricle. An ear. Applied to earlike lobes at the base of blades and to the small lobes at the summit of the sheath in *Hordeae. Auriculate.* Provided with ears.

Awn. A slender bristle at the end (rarely on the back or edge), of an organ. In grasses the awn is usually a continuation of the midnerve (sometimes also of the lateral nerves) of the glumes or lemmas, rarely of the palea.

Axil. The angle between an organ and its axis. Applied especially to the angle between a leaf and its stem and between a branch or pedicel and its axis. *Axillary.* Growing in an axil.

Axis. The main stem of an inflorescence, especially of a panicle. Compare *rachis.*

Barbed. Furnished with retrorse projections. Applied to the spines of *Cenchrus.*

Beak. A hard point or projection. Applied to seeds and fruits.

Bearded. Furnished with long stiff hairs, as the nodes of *Andropogon barbinodis*, the callus of *Stipa spartea*, the throat of the sheath of *Sporobolus cryptandrus*, and the main axils of the inflorescence of *Eragrostis spectabilis.*

Bifid. Two-cleft or two-lobed, applied to the summit of glumes, lemmas, and paleas. The lemmas of *Bromus* are usually bifid at apex.

Blade. The part of a leaf above the sheath.

Bract. The reduced leaves of the inflorescence and upper part of a shoot. Compare scale.

Branch. A lateral stem. Applied to the foliage stems or culms, and to the lateral stems of an inflorescence. *Branchlet.* A branch of the second or higher order.

In open much-branched panicles the main branches from the axis are branches of the first order, the branchlets from these are branches of the second order and so on.

Bristle. A stiff slender appendage likened to a hog's bristle. An awn is a kind of bristle. In grasses the term is applied to the modified branchlets at the base of the spikelets in *Setaria* and allied genera, and to the prolongation of the rachis in *Panicum*, sect. *Paurochaetium*, and a few other groups.

Bulb. A subterranean bud with fleshy scales like the onion. The so-called bulbs of grasses are corms (which see). *Bulbous.* Swollen at base like a bulb or corm. Said of the base of the stem of some species of *Melica*, *Phleum*, *Phalaris*, and so on. *Bulblets.* Small bulbs or corms. Applied also to the proliferous buds in the inflorescence of certain grasses, as *Poa bulbosa*, proliferous forms of *P. arctica*, *P. alpina*, and others.

Callus. The indurate downward extension of the mature lemma in *Stipa*, *Aristida*, and some other genera. Morphologically such a callus is a part of the rachilla. In *Heteropogon* and other *Andropogoneae* the callus is an oblique part of the rachis which extends downward from the spikelet. In *Raphis* the callus is a part of the peduncle. The term callus is also applied to the thickened lower joint and first glume of *Eriochloa* (callus, a thickened part). *Callus hairs.* The hairs at the base of the floret of *Calamagrostis* and some other genera.

Canescent. Gray-pubescent or hairy.

Capillary. Very slender or hairlike.

Capitate. In a globular cluster or head.

Carinate. Keeled. Said of glumes, lemmas, and other parts when flattened laterally, with a sharp keel.

Cartilaginous. Hard and tough but elastic, like cartilage.

Caryopsis. The grain or fruit of grasses. The seed coat is grown fast to the pericarp as in the grain of wheat or corn. In a few grasses the seed is free within the pericarp, as in *Sporobolus* and *Eleusine.*

Cespitose. Tufted; several or many stems in a close tuft.

Chartaceous. Having the texture of writing paper.

Ciliate. Fringed with hairs on the margin (like an eyelash). *Ciliolate.* Minutely ciliate.

Circinate. Coiled from the top downward.

Clavate. Club-shaped; gradually thickened upward, and more or less circular in cross section.

Cleistogamous. Applied to flowers or florets when fertilized without opening. *Cleistogene.* A cleistogamous flower, such as found in *Triplasis* and *Danthonia.*

Collar. The area on the outer side of a leaf at the junction of sheath and blade.

Column. The lower undivided part of the awns of certain species of *Aristida;* the lower twisted segment of the awn in *Andropogoneae.*

Compact. Said of closely flowered inflorescences. Compare dense.

Compressed. Flattened laterally, as the compressed spikelets of *Uniola latifolia* and the compressed sheaths of *Andropogon virginicus.* If the organ is also sharply keeled, it is said to be compressed-keeled.

Conduplicate. Folded together lengthwise with the upper surface within, as in the blades of many grasses.

Continuous. Said of the rachis or other organ which does not disarticulate. The opposite of articulate or disarticulating.

Contracted. Said of inflorescences that are narrow or dense, the branches short or appressed. The opposite of open or spreading.

Convex. Rounded on the surface. Said especially of glumes and lemmas that are rounded on the back instead of keeled.

Convolute. Rolled longitudinally. Said mostly of blades, one edge being inside and the other outside.

Cordate. Heart-shaped. Said mostly of the base of blades. *Cordate-clasping.* Heart-shaped at base with the lobes overlapping around the stem.

Coriaceous. Leathery in texture.

Corm. The hard swollen base of a stem. In *Melica* the corm is a single enlarged lower internode. In *Panicum bulbosum* several internodes are involved. Compare *bulb.*

Crown. The persistent base of a tufted perennial herbaceous grass. Also the hard ring or zone at the summit of some species of *Stipa.* The "pappuslike crown" of dissected teeth is mentioned under *Pappophorum.*

Culm. The jointed stem of grasses.

Cuneate. Wedge-shaped with the narrow part below.

Cuspidate. Tipped with a sharp short rigid point.

Deciduous. Falling away, as the awn of *Oryzopsis*, the spikelets of some species with articulate pedicels, and the blades of some bamboos. The opposite of persistent.

Decumbent. Curved upward from a horizontal or inclined base. Said of stems or culms.

Decurrent. Extending down an organ below the insertion. Said especially of ligules decurrent on the margins of the sheath.

Dehiscence. Spontaneous opening of an organ, as the opening of anthers to let out the pollen.

Dense. Said of inflorescences in which the spikelets are crowded. The opposite of open or loose. Compare *compact.*

Depauperate. Reduced or undeveloped. Said especially of impoverished or dwarfed plants below the average size.

Diffuse. Open and much-branched. Said of panicles.

Digitate. Several members arising from the summit of a support. Said especially of racemes or spikes from the summit of a peduncle, as in *Digitaria* and *Cynodon.*

Dioecious. Unisexual, the two kinds of flowers on separate plants, as in *Buchloë.*

Disarticulating. Separating at maturity. Compare articulate.

Distichous. Conspicuously two-ranked, as the leaves of *Distichlis* and *Zea.*

Divaricate. Widely and stiffly divergent as the branches of certain open panicles (e.g., *Oryzopsis hymenoides*).

Dorsal. Relating to the back of an organ.

Dorsiventral. With a distinct upper and lower surface. Said of shoots bearing broad flat blades in a horizontal position, the blades turned into the same plane.

Drooping. Erect to spreading at base but inclining downward above, as the branches of a panicle.

Ellipsoid. An elliptic solid. Said of the shape of panicles, spikelets, and fruits.

Elliptic. Shaped like an ellipse. Said of blades and other flat surfaces.

Elongate. Narrow, the length many times the width or thickness.

Emarginate. Notched at the apex.

Equitant. Astride. Said of approximate compressed-keeled sheaths or blades at the base of a culm that infold each other like the leaves of *Iris.*

Erose. Irregularly notched at apex as if gnawed. Said of glumes and lemmas.

Excurrent. Running beyond. The midnerve is excurrent from the lemma as an awn in many grasses.

Exserted. Protruding. The awns of some species of *Calamagrostis* are exserted, protruding beyond the spikelet.

Falcate. Scimiter-shaped, curved sidewise and flat, tapering upward. Said of certain asymmetric blades.

Fascicle. A little bundle or cluster. Said of clustered leaves, branches of a panicle, and spikes or racemes on an axis.

Ferrugineous, ferruginous. Rust colored.

Fertile. Capable of producing fruit, having pistils. A fertile floret may be pistillate or perfect.

Fibrillose. Furnished with fibers. Said especially of the old basal sheaths of some grasses.

Filiform. Threadlike.

Fimbriate. Fringed, the hairs longer or coarser as compared with ciliate.

Flabellate. Fan-shaped. Said of the nerves of the lemmas of *Anthochloa* and the inflorescence of *Miscanthus sinensis.*

Flexuous. Bent alternately in opposite directions.

Floret. The lemma and palea with included flower (stamens and pistil). Florets may be perfect, staminate, pistillate, neuter, sterile, and so on.

Folded. Conduplicate. Said chiefly of blades.

Fruit. The ripened pistil. In grasses the fruit is usually a caryopsis. The term fruit is also applied to the caryopsis and parts that may enclose it permanently at maturity. In *Panicum* the indurate fertile lemma and palea with the enclosed caryopsis is the fruit. In *Cenchrus* it is the entire bur.

Fusiform. Spindle-shaped. A solid that is terete in the middle and tapering toward each end.

Geniculate. Bent abruptly. Said of awns and of the lower nodes of the culm.

Gibbous. Swollen on one side as the glume of *Sacciolepis.*

Gland. A protuberance or depression, usually minute, that secretes, or appears to secrete a fluid. *Glandular.* Supplied with glands. The glands may be depressed as in *Eragrostis cilianensis* and *Heteropogon melanocarpus.*

Glaucous. Covered with a waxy coating that gives a blue-green color as in the leaf of the cabbage, and the bloom of the grape.

Glomerate. Collected in heads.

Glumes. The pair of bracts at the base of a spikelet.

Gregarious. Growing in groups or masses.
Herbaceous. Having the characters of an herb; opposed to woody; thin in texture and green in color, as the herbaceous lemmas of *Poa.*
Hirsute. Pubescent with straight rather stiff hairs. *Hirsutulous, hirtellous.* Minutely hirsute.
Hispid. Pubescent with stiff or rigid hairs. *Hispidulous.* Diminutive of hispid.
Hyaline. Thin and translucent or transparent.
Imbricate. Overlapping, as the lemmas in many spikelets.
Implicate. Tangled, as the branches of the panicle of *Panicum implicatum.*
Indurate. Hard. Compare chartaceous and coriaceous.
Inflated. Puffed up, bladdery.
Inflexed. Turned in at the margins. Said especially of the margin of the glumes or lemmas in some species.
Inflorescence. The flowering part of a plant.
Innovation. The basal shoot of a perennial grass.
Internerves. The spaces between the nerves. Said of glumes and lemmas.
Internode. The part of a stem between two successive nodes.
Interrupted. The continuity broken. Said especially of dense inflorescences whose continuity is broken by gaps.
Involucre. A circle of bracts below a flower or flower cluster. In grasses applied to the cluster of bristles or sterile branchlets below the spikelets in *Pennisetum* and a few other genera, and to the bony bead of *Coix.*
Involute. Rolled inward from the edges, the upper surface within. Said of blades.
Joint. The node of a grass culm. The internode of an articulate rachis.
Keel. The sharp fold at the back of a compressed sheath, blade, glume, or lemma. The palea and sometimes the glumes and lemmas may be two-keeled. Keel is used because of the similarity to the keel of a boat.
Lacerate. Torn at the edge or irregularly cleft, as in some ligules.
Lanate. Woolly, clothed with long tangled hairs.
Lanceolate. Rather narrow (surface) tapering to both ends, the broadest part below the middle.
Laterally (compressed). Flattened from the sides, as certain spikelets, glumes, and lemmas.
Lax. Loose. Said of a soft or open inflorescence and of soft or drooping foliage.
Leaf. The lateral organ of a stem, in grasses consisting of sheath and blade.
Lemma. The bract of a spikelet above the pair of glumes.
Ligule. The thin appendage on the inside of a leaf at the junction of sheath and blade.
Linear. Long and narrow with parallel sides. Said of surfaces, such as a blade. Said also of spikelets and other organs, having in mind the shape of a longitudinal section.
Lobe. A segment of an organ, usually rounded or obtuse. Applied especially to the divisions of a cleft lemma.
Loose. Open. Said of panicles. The opposite of dense or compact.
Membranaceous. Thin like a membrane.
Monoecious. Unisexual, the two kinds of flowers on the same plant, as in *Zea* and *Zizania.*
Mucro. A minute awn or excurrent midnerve of an organ. *Mucronate.* Provided with a mucro.
Navicular. Boat-shaped. Shaped like the bow of a canoe. Applied especially to the tip of blades.
Nerve. The vascular veins (mostly longitudinal) of the blades, glumes, and lemmas.
Neuter. Without stamens or pistils. Said of florets or spikelets.
Nodding. Inclined somewhat from the vertical. Said of panicles.
Node. The joint of a culm.
Ob-. A prefix meaning inversely, as obovate.
Oblong. Longer than wide, with parallel sides, but not so long as linear. Applied also to panicles and other parts, having in mind a longitudinal section.
Obsolete. Almost wanting. Applied to organs usually present.
Obtuse. Rounded at the apex. Contrasted with acute.
Open. Loose. Said of panicles. Opposite of dense or compact.
Oval. Broadly elliptic.
Ovate. The shape of the longitudinal section of an egg, broadest below the middle.
Ovoid. An egg-shaped solid.
Palea. The inner bract of a floret.

Panicle. An inflorescence with a main axis and subdivided branches. It may be compact and spikelike (*Phleum pratense*) or open (*Avena sativa*).
Papery. See chartaceous.
Papilla. A minute nipple-shaped projection.
Papillose. Bearing papillae. *Papillose-pilose.* Bearing stiff hairs arising from papillae.
Pappus. In grasses mentioned under *Pappophorum*, referring to the awns as forming a pappuslike crown, similar to the pappus in certain species of *Compositae.*
Pectinate. Comblike. Used especially with some species of *Bouteloua* where the spikelets are set close together, parallel and divergent from the rachis like the teeth of a comb.
Pedicel. The stalk of a spikelet. *Pedicellate.* Having a pedicel. Opposed to sessile.
Peduncle. The stalk or stem of an inflorescence. *Peduncled.* Having a peduncle.
Pendent. Hanging down.
Perennial. Lasting more than 1 year. Applied to grasses in which the underground parts last more than 1 year; and to woody culms to distinguish them from those which die to the ground (herbaceous) even though the underground parts are perennial.
Perfect. Applied to flowers having both stamens and pistil.
Pericarp. The ripened walls of the ovary when it becomes a fruit.
Persistent. Remaining attached, either after other parts have been shed, or for a considerable period. The paleas of certain species of *Eragrostis* persist after the fall of the lemmas. Also used as the opposite of deciduous.
Petiole. The stalk of a leaf blade. Used with the leaves of many bamboos, and with some other broad-leaved species in which the blade contracts into a petiole. *Petiolate.* Having a petiole.
Pilose. Pubescent with soft straight hairs.
Pistillate. Applied to flowers bearing pistils only and to an inflorescence or a plant with pistillate flowers.
Pitted. Marked with small depressions or pits. Applied to the fruit (fertile lemma) of certain species of *Olyra.* Also applied to the pinhole depression in the glume of certain species of Andropogoneae.
Plicate. Folded in plaits lengthwise as the blades of *Panicum*, sect. *Ptycophyllum.*
Plumbeous. Lead colored, greenish drab, as the spikelets of *Eragrostis ciliaensis.*
Plumose. Feathered, having fine hairs on each side. Said chiefly of awns and slender teeth.
Proliferous. Bearing buds or bulblets in the inflorescence. Compare *bulblets.*
Pruinose. Having a waxy powdery secretion on the surface. Having a more pronounced bloom than when glaucous.
Puberulent. Diminutive of pubescent. Minutely pubescent.
Pubescent. Covered with hairs. Applied especially when the hairs are short and soft. *Pubescence.* A hairy covering.
Pulvinus. The swelling at the base of the branches of some panicles which cause them to spread.
Pustulose. Blistery, furnished with pustules or irregular raised pimples as in the spikelets of *Panicum angustifolium.* Not as definitely roughened as papillose.
Pyramidal. Pyramid-shaped. Applied sometimes to panicles that are actually conical.
Pyriform. Pear-shaped. Obovoid with attenuate base. Applied to the shape of spikelets.
Raceme. An inflorescence in which the spikelets are pediceled on a rachis. *Racemose.* In racemes.
Rachilla. A small rachis. Applied especially to the axis of a spikelet.
Rachis. The axis of a spike or raceme.
Reticulate. In a network. Applied especially to the cross-veining on some spikelets, as *Panicum fasciculatum.*
Retrorse. Pointing backward, as the hairs on the sheaths of certain species of *Bromus.*
Revolute. Turned or rolled backward from both edges. Said chiefly of blades.

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Rhizome. An underground stem; rootstock. The rhizomes of grasses are usually slender and creeping. They bear scales at the nodes, the scales sometimes remote and inconspicuous (*Poa pratensis*), sometimes imbricate and prominent (*Spartina*). *Rhizomatous.* Having rhizomes or appearing like rhizomes, as the base of a decumbent stem.

Rosette. A cluster of spreading or radiating basal leaves, as in the overwintering stage of *Panicum*, sect. *Dichanthelium.*

Rudiment. An imperfectly developed organ or part. *Rudimentary.* Underdeveloped. Applied also to one or more rudimentary florets at the summit of the spikelet of some genera, as *Melica, Bouteloua, Chloris.*

Rugose. Wrinkled. Said especially of the fruit of some species of *Panicum* and allied groups.

Saccate. Bag or sac-shaped, as the second glume of *Sacciolepis.*

Scabrous. Rough to the touch. Covered with minute points, teeth, or very short stiff hairs. *Scaberulous.* Minutely scabrous.

Scale. The reduced leaves at the base of a shoot. Said especially of the reduced or rudimentary leaves on a rhizome.

Scarious. Thin, dry, and membranaceous, not green.

Secondary. Subordinate; below or less than primary. Said of branches arising from primary branches.

Secund. One-sided or arranged along one side.

Self-pollinated. Pollinated in the bud or by pollen from the same flower. The opposite of cross-pollinated.

Serrate. Saw-toothed; having sharp teeth. *Serrulate.* Minutely serrate.

Sessile. Without a pedicel or stalk. The opposite of pediceled. Said of blades, spikelets, and other organs.

Setaceous. Bristlelike. Said especially of slender teeth attenuate to an awn.

Sheath. The lower part of a leaf that encloses the stem.

Sinuous. Wavy.

Smooth. Not rough to the touch. Compare glabrous, without hairs but which may be rough to the touch.

Spathe. A sheathing bract of the inflorescence found especially in the Andropogoneae.

Spike. An unbranched inflorescence in which the spikelets are sessile on a rachis. *Spikelike.* A dense panicle in which the pedicels and branches are short and hidden by the spikelets as in *Phleum.*

Spikelet. The unit of the inflorescence in grasses, consisting of two glumes and one or more florets.

Spreading. Having an outward direction. Said especially of the branches of a panicle when they lie between ascending and the horizontal direction (right angles).

Squarrose. Spreading or recurved at the tip. Said of the tips of lemmas.

Stamen. The part of the flower that bears the pollen. *Staminate.* Containing stamens only. Also applied to an inflorescence or a plant with staminate flowers.

Sterile. Without pistils. A sterile floret may be staminate or neuter. It may even lack a palea, and consist of nothing but a lemma.

Stipe. A minute stalk to an organ. Applied especially to a pistil. Also sometimes to the prolongation of a rachilla as in *Calamagrostis. Stipitate.* Having a stipe.

Stolon. A modified propagating stem above ground creeping and rooting or curved over and rooting at the tip. *Stoloniferous.* Bearing stolons.

Stramineous. Straw-colored, pale yellow.

Striate. Marked with fine parallel lines or minute ridges.

Strict. Stiffly upright.

Strigose. Rough with stiff hairs; harshly pubescent.

Sub-. A prefix to denote somewhat, slightly, or in a less degree; as subacute, somewhat acute.

Subtend. To be below, as a bract subtends a branch in its axil.

Subulate. Awl-shaped.

Succulent. Fleshy or juicy.

Sulcate. Grooved or furrowed. Said chiefly of stems, sheaths, and slender blades.

Tawny. Pale brown or dirty yellow.

Teeth. Pointed lobes or divisions.

Terete. Cylindric and slender, as the usual unflattened stems or culms of grasses.

Tessellate. The surface marked with square or oblong depressions.

Trifid. Divided into three parts as the awns of *Aristida.*

Truncate. Ending abruptly, as if cut off horizontally.
Tuberculate. Furnished with small projections.
Turgid. Swollen, as the pulvini of a panicle during anthesis.
Unilateral. One-sided or turned to one side.
Unisexual. Said of flowers containing only stamens or only pistils.
Verticillate. In verticils or whorls.
Villous. Pubescent with long soft hairs.
Virgate. Straight and erect; wand-shaped.
Web. The cluster of slender soft hairs at the base of the floret in certain species of *Poa.*
Whorl. A cluster of several branches around the axis of an inflorescence.
Wing. A thin projection or border; for example, the thin borders on the rachis of certain species of *Digitaria* and *Paspalum.*

ADDITIONS AND CORRECTIONS

Page 77. *Festuca idahoensis.* Omit Arizona and New Mexico from range.

Page 158. *Eragrostis hirsuta.* Add Tennessee to range.

Page 204. The three varieties of *Melica imperfecta* should be in italics. They are scarcely worthy of formal varietal standing.

Page 231. *Agropyron repens.* Omit New Mexico from range.

Page 237. *Agropyron pseudorepens.* Reconsideration of this species in the light of collections received while the text was in press shows it to be distinct from *A. pauciflorum.* The variety *magnum* is doubtful, the underground parts are lacking in the type specimen and the blades are wide and rather lax.

Page 286. *Trisetum montanum.* Add Arizona to range.

Page 313, after *Calamagrostis perplexa* insert the following which was described while the Manual was in press.

Calamagrostis cainii Hitchc. Culms slender, erect, scabrous below the panicle, 30 to 40 cm tall; sheaths glabrous; blades erect, flat, more or less involute toward the finely attenuate tip, glabrous beneath, scaberulous on the upper surface, narrowed toward the base, the basal ones as much as 35 cm long, 1 to 2 mm wide; panicle pale or whitish, loose, 6 to 10 cm long, the branches ascending or somewhat spreading, verticillate, scabrous, naked below, 1 to 2 cm long, bearing 1 to few spikelets, the whorls 7 to 15 cm apart, the pedicels scabrous-pubescent; glumes narrow, acuminate or slightly aristate, 5 to 6 mm long; lemma narrow, acuminate, minutely scabrous near the summit, the callus hairs about 1 mm long, the awn arising about 1 mm above the base, somewhat geniculate, twisted below, the tip bent to one side, somewhat exceeding the glumes; palea a little shorter than the lemma; prolongation of the rachilla very short, the hairs 1 to 2 mm long. Known only from the type collection, shrubby summit of Mount LeConte, Tenn.

Page 373. *Muhlenbergia racemosa.* Extend range to Virginia.

Page 445. *Aristida basiramea.* Add New Hampshire and New York to range. Probably extends to Maine as a native species. (Fide Rhodora 36: 406. 1934.)

Page 466, line 7 from bottom. For (*H. longifolia* Vasey), read (*H. cenchroides* var. *longifolia* Vasey).

Page 535. For *Phleum tenue* Schrad. read *P. subulatum* (Savi) Aschers. and Graebn. See page 727.

Page 626. *Panicum annulum.* Add Michigan to range.

Page 774. Transfer paragraph on *Agropyron japonicum* to Unidentified Names, page 979.

Page 816, under (27) *Bromus racemosus* insert: *Bromus mollis* forma *leiostachys* Fernald, Rhodora 35: 316. 1933. Based on *B. mollis* var. *leiostachys* Hartm.

Page 982. *Setaria caudata* var. *pauciflora* Jones. An examination of the cited specimens shows them to belong to *Seteria macrostachya* H. B. K.

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